

**SPACE-DERIVED TRANSPARENCY:  
PLAYERS, POLICIES, IMPLICATIONS, AND SYNERGIES**

BY  
C. J. KINNAN

A THESIS PRESENTED TO THE FACULTY OF  
THE SCHOOL OF ADVANCED AIRPOWER STUDIES  
FOR COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIRPOWER STUDIES

AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

JUNE 2001

Report Documentation Page		
<b>Report Date</b> 01JUN2001	<b>Report Type</b> N/A	<b>Dates Covered (from... to)</b> -
<b>Title and Subtitle</b> Space-Derived Transparency: Players, Policies, Implications, and Synergies	<b>Contract Number</b>	
	<b>Grant Number</b>	
	<b>Program Element Number</b>	
<b>Author(s)</b> Kinnan, C. J.	<b>Project Number</b>	
	<b>Task Number</b>	
	<b>Work Unit Number</b>	
<b>Performing Organization Name(s) and Address(es)</b> School of Advanced Airpower Studies Air University Maxwell AFB, AL	<b>Performing Organization Report Number</b>	
<b>Sponsoring/Monitoring Agency Name(s) and Address(es)</b>	<b>Sponsor/Monitor's Acronym(s)</b>	
	<b>Sponsor/Monitor's Report Number(s)</b>	
<b>Distribution/Availability Statement</b> Approved for public release, distribution unlimited		
<b>Supplementary Notes</b> The original document contains color images.		
<b>Abstract</b>		
<b>Subject Terms</b>		
<b>Report Classification</b> unclassified	<b>Classification of this page</b> unclassified	
<b>Classification of Abstract</b> unclassified	<b>Limitation of Abstract</b> UU	
<b>Number of Pages</b> 137		

## **Disclaimer**

The conclusions and opinions expressed in this document are those of the author. They do not reflect the official position of the US Government, Department of Defense, the United States Air Force, or Air University.

### *About the Author*

Major Christopher J. Kinnan was commissioned as a distinguished graduate through the Reserve Officer Training Corps, Auburn University in 1986. Following Undergraduate Missile Training at Vandenberg AFB, California in 1987, he served in both the Minuteman III Command Data Buffer and Peacekeeper Intercontinental Ballistic Missile systems as a deputy and missile combat crew commander and instructor at Francis E. Warren AFB, Wyoming. Returning to Vandenberg AFB in 1991, he taught both Minuteman III and Peacekeeper operations and academics at UMT and then served as a faculty development trainer and as an instructor for the Space and Missile Orientation Course. Board selected to crossflow to the space field in 1994, he served as the Chief of Tactical Operations for the Ballistic Missile Early Warning System at Thule AB, Greenland. In 1995, he was assigned to the Space Warfare Center at Schriever AFB, Colorado where he served as the Chief of the Test and Evaluation Division and served on the Commanders Action Group. In 1997, he attended the USAF Weapons School at Nellis AFB, Nevada and remained on the faculty, serving as the assistant operations officer for the Space Division. He graduated from the Army Command and General Staff College in 2000. He has a Bachelors degree in Russian/East European Area Studies from Auburn University and a Master's degree in Management, Information Systems from Lesley College. In July 2001, Major Kinnan was assigned to Air Force Space Command as a member of the Commander's Action Team for USCINCSpace and the Commander, Air Force Space Command.

## *Acknowledgements*

I must first acknowledge the superb guidance and firm support of Lieutenant Colonel Pete Hays, a brilliant space policy analyst without whom I might not have discovered this topic. Additionally, I thank Dr. James S. Corum for his candor and direction in providing focus to the research while testing my affability. I also thank Mr. Bill Arkin of Human Rights Watch and the *Washington Post* for offending my warrior sensibilities enough to enable me to walk outside the safe walls of military academia and scholarship.

I reserve my greatest esteem for my friend Major M.V. “Coyote” Smith for his keen wit, sound insight, and smooth arguments – he and his wife Miss Alice have always been good to me. Lt Col Rob “Snort” Givens, a closet spaceman if there ever was one, provided dogged and challenging arguments to my cherished space positions and encouragement to my thinking, making me feel part of the Air Force’s future.

Thanks to Colonel Ken Feldman of the Space Warfare Center and Lt Col Gregg “Mr. Bill” Billman for turning me onto SAAS. I thank my fellow space officers at SAAS for ranging the space spectrum from sophist to zealot and acting as wise sounding boards. My thanks to all the Weapons School space “bubbas” for taking a chance to step outside “mother space” and educate others in the quest for space ubiquity.

Most importantly, I thank my family, especially my father Joseph E. Kinnan, Ph.D, Colonel, USAF (ret) and my mother Sandy for their unfailing love for their

children and faith in education. As my parents and my heroes, they touched the future as they prepared me well for this world. There is no way I can ever begin to make a down payment to return all they have given me. I and my sisters, Cathy, Mary, Monica, Rachel, and Molly, cherish them.

## *Abstract*

Space-derived transparency will become a common means of monitoring, preventing, and mitigating crises, verifying compliance with treaties and law, and enabling confidence and security building measures. Democratization and globalization, the proliferation of information technologies, the availability of commercial space high-resolution imagery, and the growing influence of NGOs invite this question: What is (space-derived) transparency and what effect does it have on US security policy? Three camps have emerged in the debate – Horaeists who seek to build a transnational society through complete transparency; Preservationists, mostly military, who fear the threat to national security, want to deny most space-derived information to non-traditional/non-state actors; and Synergists who seek to capitalize on the best of both camps. There is evidence suggesting that space-derived transparency is an inevitable trend and will resist even the best means of preservationist control. Space-derived transparency may change the dynamic of the security environment by introducing new players into the policy fomentation and implementation process. These players, if not properly schooled in imagery analysis or the potential effects of their use of misinterpreted space-derived imagery, could force policy makers to make fast, ill-considered decisions in order to respond to incidents. In some cases this fast response will defuse potential crises and in other situations these rushed decisions might result in policies without considering the potential consequences, which could turn incidents into crises. Space-derived transparency is a step forward into the future for each camp . . . the challenge for the United States lies in forging synergies in an increasingly transparent world while maintaining the balance between openness and security.

## *Contents*

	<i>Page</i>
DISCLAIMER .....	ii
ABOUT THE AUTHOR.....	iii
ACKNOWLEDGEMENTS .....	iv
ABSTRACT .....	vi
ILLUSTRATIONS.....	ix
INTRODUCTION TO A TRANSPARENT WORLD .....	1
The New Age .....	2
Transparency and the Dynamics of the New World.....	3
The Questions .....	4
The Transparency Camps .....	5
Literature.....	7
Terminology.....	11
TRANSPARENCY AND SPACE-DERIVED TRANSPARENCY .....	14
Purpose.....	15
Transparency.....	15
Transparency Components.....	22
Space Derived Transparency .....	23
Summary .....	36
POSSIBLE EFFECTS OF SPACE-DERIVED TRANSPARENCY .....	37
New Era – New Effects.....	38
Purpose.....	39
WWW-Effect.....	39
CNN Effect .....	42
Space Derived Transparency and the “Effects” .....	47
The Emerging Role of UHR Satellite Imagery.....	49
Summary .....	55
SPACE-DERIVED TRANSPARENCY PLAYERS AND SYSTEMS .....	57
Purpose.....	58
The Players.....	58
Space-Derived Transparency Systems.....	72



Summary .....	80
POLICY IMPLICATIONS FOR AND OF SPACE-DERIVED	
TRANSPARENCY .....	82
Purpose.....	84
Tensions and Balances.....	84
NGO Policy Players – Potentials and Implications .....	93
NGOs and UHR Imagery.....	99
An Opportunity for Synergy? .....	102
Summary .....	106
CONCLUSION .....	108
The Emerging World .....	109
Themes and Conclusions .....	110
Recommendations to Realize Synergy .....	111
Final Thoughts .....	118
BIBLIOGRAPHY .....	122

## ***Illustrations***

	<i>Page</i>
Table 1. Transparency Camp Summary .....	34
Table 2. Conceptual Variations of CNN Effect .....	43
Table 3. Commercial Remote Sensing Systems.....	78
Table 4. UHR Imagery Users and Uses .....	114

## Chapter 1

### INTRODUCTION TO A TRANSPARENT WORLD

*Adalai Stevenson: . . . Sir, let me ask you one simple question. Do you, Ambassador Zorin, deny that the USSR has placed and is placing medium and intermediate range ballistic missiles and sites in Cuba? Yes or No? Don't wait for the translation, yes or no?*

*Valerian Zorin: I am not in an American courtroom, sir, and therefore I do not wish to answer a question that is put to me in a fashion in which a prosecutor puts questions . . .*

*Adalai Stevenson: You are in a courtroom of world opinion right now and you can answer yes or no. You have denied that they exist and I want to know whether I have understood you correctly.*

*Valerian Zorin: Continue with your statement. You will have your answer in due course.*

*Adalai Stevenson: I am prepared to wait for my answer until hell freezes over . . .*

—Exchange between American and Soviet UN Ambassadors  
Adalai Stevenson and V.I. Zorin in the UN Security Council,  
Thursday, 25 October 1962, 4:00 PM

Within moments of this exchange, aides to Ambassador Stevenson set up easels that were then used to display annotated images from U-2 aircraft showing Soviet missiles in Cuba being made operationally ready. The images were both damning and compelling. The confrontation at the United Nations was the lead story for worldwide media; it was, for example, played out on all the United States television networks and was reported verbatim in the *New York Times*. This very public superpower confrontation arguably turned world opinion against the U.S.S.R. during the 1962 Cuban Missile Crisis. The U-2 pictures of the Soviet missile sites that were displayed in the

## Transparency and the Dynamics of the New World

*Just what is transparency? Put simply, transparency is the opposite of secrecy. Secrecy means deliberately hiding your actions; transparency means deliberately revealing them.*

—Dr. Ann Florini, *The End of Secrecy*

Transparency employed by the United States in 1962 harmed the image and the operations of the Soviet Union and its military, yet it helped diffuse tension. Dr. Florini's definition of transparency appears incomplete because it represents the ideal world, one in which all nations voluntarily disclose information, particularly military and political information, about themselves. Frankly, this world doesn't exist.

Transparency can mean not only exposing the actions of others, but that you be willing to reveal things about yourself. It can be the "opening" of things that you may want to keep secret, such as the Soviets wanting to keep the existence of offensive missiles in Cuba a secret in 1962. Despite Dr. Florini's idealistic definition, transparency today is at best a mix of "legislated" voluntary and involuntary disclosure by states, private ventures, and non-state actors. As it is the nature of world leaders to be secretive, most are reticent to voluntarily disclose military, industrial, and economic secrets. Yet, in some cases, they may not have a choice.

With the proliferation of ultra-high resolution (UHR) commercial space-derived information products and the means to order and distribute them anonymously through the Internet, space-derived transparency is a cause for concern at the highest levels of US government, most especially in the Department of Defense. UHR imagery is derived from satellite systems with ground sample distance (GSD) resolution capability of less than one-meter meaning that it is possible to identify distinct objects of less than a meter in size. NASA defines commercial remote sensing systems as those where non-governmental ventures have, ". . . at least partial control of a satellite, sensor, and/or data."<sup>1</sup> Whereas (space-derived) transparency proponents hail the marvels of technology

---

<sup>1</sup> "Overview of Commercial Remote Sensing," Stennis Space Center – National Aeronautics and Space Administration Commercial Remote Sensing Program. On line, Internet, 14 April 2001, available from <http://www.geog.umd.edu/landcover/cress/crs.htm>.

inspired openness, critics of transparency particularly in DoD ask, “what if adversaries can see our moves before we make them and can prepare a counter-response?”

## The Questions

The proliferation of formerly restricted UHR space imaging technologies seems to be a key factor in space-derived transparency, which in turn appears to be an inevitable trend in world affairs. For example, as of May 2000, the National Oceanic and Atmospheric Administration (NOAA), the US government agency responsible for licensing commercial remote sensing satellites has issued 13 licenses for 17 remote sensing satellites.<sup>2</sup> This amounts to more than \$2 billion in commercial investment. This does not include remote sensing craft from France, India, Canada, and Israel.

Increased proliferation of and investment in remote sensing satellites suggests there is an emerging market for these images. The US government’s National Imagery and Mapping Agency (NIMA) Fiscal Year 2000 -2005 budget for commercial imagery from Space Imaging Corp. of Denver, Colorado alone is \$2.7 billion.<sup>3</sup> The Report of the Independent Commission on the National Imagery and Mapping Agency calls for NIMA to purchase \$350 million per year in commercial imagery products.<sup>4</sup> Foreign entities did more than \$450 million in business with US based commercial imaging companies from 1999-2000.<sup>5</sup>

In light of this business trend driving the demand for and growth of commercial space imagery products, what is (space-derived) transparency and what effect might it have on US policy? What are the arguments both for and against transparency? What are its components? What types of space-based remote sensing systems support transparency? How are images acquired and by whom? How might they be used? Who

---

<sup>2</sup> Frank Sietzen. “Spy Satellite Image Business Booms,” Space.com. 1 May 2000. On line, Internet, 14 April 2001, available from [http://space.com/business/technology/business/commercial\\_remote\\_sense-000427.html](http://space.com/business/technology/business/commercial_remote_sense-000427.html). A check of the NOAA licensing website <http://www.licensing.noaa.gov/list.htm> confirms the numbers reported in this article. Accessed on 23 April 2001, the information on the website is current as of 9 January 2001.

<sup>3</sup> National Imagery and Mapping Agency Budget. GIC Budget for Contract Production. Omnibus Contractor Status (as of 13 April 2001). On line, Internet, 21 April 2001, available from <http://164.214.2.59/ogic/budget.html>.

<sup>4</sup> Report of the Independent Commission on the National Imagery and Mapping Agency, *The Information Edge: Imagery Intelligence and Geospatial Information in an Evolving National Security Environment* (Washington, D.C.: Government Printing Office, 2000).

are the key players using space-derived transparency and what benefit might they derive or influence might they have? What policies, if any, should the US government pursue regarding space-derived transparency?

## **The Transparency Camps**

*Yet precisely because transparency represents such a profound change – both in the distribution of power and the way in which it is exercised – its spread has provoked resistance from some quarters.*

—Dr. Ann Florini, *The End of Secrecy*

*. . . the US military must begin preparing itself to maintain a superior stance in the age of transparency – either through negating its effects or developing new areas of strength.*

—Lt Col Beth Kaspar, *The End of Secrecy? Military Competitiveness in the Age of Transparency*

Transparency comes from information. Information is derived from data collected from people and specialized systems, reported to appropriate agencies, and analyzed so that developing situations are understood and an appropriate course of action can be implemented – ideally before a bad situation becomes worse. Of course, nations and groups who seek goals that conflict with U.S. interests might use space-derived information to counter the actions of the United States. There will always be those that are opposed – they will likely find other ways to get their message out within whichever camp – horaeist, protectionist, or synergist – best identifies with their position.

### **Horaeists**

Dr. Ann Florini of the Carnegie Endowment for International Peace has developed and explored the concept of transparency in light of increased space commercialization and greater Internet access. She argues transparency can lay the foundation for a civil “global or transnational” society rooted in democratic ideals – among them are order, justice, and peace, hence the term horaeists from the Horaes, the

---

<sup>5</sup> Sietzen. “Spy Satellite Image Business Booms.”

Greek mythological goddesses Eunomia (order), Dice (justice), and Eirene (peace).<sup>6</sup> A critical note, one often overlooked, is that her terminology “transnational civil society” includes not only “noble” groups such as those focused on human rights and arms control, but also “repugnant” groups such as neo-Nazi and other so-called “hate” and terror groups. Malevolent forces lurk in so-called “civil” society.

While she thinks there is a natural tendency to protect secrets, Dr. Florini accepts the need for nations, particularly the United States, to protect themselves from malevolent users of space-derived information. She points out that, in the absence of internationally accepted behavioral norms, transparency can aggravate conflict, might not bring about a desired change in behavior, and can release information that can be misinterpreted, or worse, misused.<sup>7</sup>

### **Preservationists**

As space-derived transparency is a potential threat to national security, the US military in particular is concerned with who has access to this kind of information, how they are using it, and what impact it might have on military operations. For the purposes of this thesis, preservationists are the security elements of a military or entity charged with protecting (national) security. Lieutenant Colonel Beth M. Kaspar speaks well for this camp in her paper *The End of Secrecy? Military Competitiveness in the Age of Transparency* by addressing DoD concerns about transparency’s effect on United States military operations.<sup>8</sup> She argues that transparency makes secrecy difficult and that the US military must prepare itself to fight in an “information transparent world,” one in which everyone will be able to see our movements. As a result, transparency poses a threat to mass, maneuver, and surprise – three key principles of war.<sup>9</sup> Focused on its potential dangers, she recommends ways to counter its effects.

---

<sup>6</sup> Ann M. Florini, *The Third Force – The Rise of Transnational Civil Society* (Washington D.C.: Carnegie Endowment for International Peace, 2000), 3.

<sup>7</sup> Ann Florini, “The End of Secrecy,” *Foreign Policy* (20 June 1998).

<sup>8</sup> Lt Col Beth M. Kaspar, “The End of Secrecy? Military Competitiveness in the Age of Transparency,” (Maxwell AFB, Ala.: Air War College, 2000), vi.

<sup>9</sup> Ibid.

## **Synergists**

While the horaeists might be seen by some as leaders of some damned idealistic crusade for a new world order, the preservationists might be seen by others as a “circle the wagons” crowd that believes transparency is a threat to their position. Complete openness has inherent dangers but so does hiding behind walls. It is within these positions that synergists operate. There is no definable spokesperson for this camp. This thesis attempts to develop the positions of this camp more fully.

## **Literature**

### **Horaeists**

Dr. Ann Florini and her research assistant Yahya Dehqanzada have written much on the subject of transparency and how commercial satellites will provide the imagery that might change the world into a more stable and civil place for all. Her articles, some co-authored with her assistant, *The End of Secrecy*<sup>10</sup>, *No More Secrets: Policy Implications of Commercial Remote Sensing Satellites*<sup>11</sup>, and *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*<sup>12</sup> demonstrate the impact of space based systems on transparency and how they empower civil society.

In addition to Dr. Florini’s articles and book on commercial space systems and transnational civil society, the role of space derived transparency is explored in the *VERTIC Verification Yearbook 2000*. VERTIC is the Verification Research, Training & Information Center, an independent, non-profit making, non-governmental organization. Its mission is to “promote effective and efficient verification as a means of ensuring confidence in the implementation of international agreements and intra-national agreements with international involvement.”<sup>13</sup> It also assists in negotiating, monitoring, and implementing agreements between entities and works to establish a confidence

---

<sup>10</sup> Ann Florini, "The End of Secrecy," *Foreign Policy* (20 June 1998).

<sup>11</sup> Ann M. Florini and Yahya A. Dehqanzada, “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites,” Carnegie Endowment for International Peace. On-line, Internet, 6 March 2001, available from <http://beta.ceip.org/files/publications/NoMoreSecrets.asp>.

<sup>12</sup> Yahya A. Dehqanzada and Ann M. Florini, “Secrets for Sale: How Commercial Satellite Imagery Will Change the World” (Washington D.C.: Carnegie Endowment for International Peace, 2000).

<sup>13</sup> VERTIC website. On-line, Internet, 9 April 2001, available from <http://www.vertic.org/>.



building regime that assures good faith adherence to the treaty or agreement by all signatories.

According to VERTIC, verification has three purposes: **detecting violations**, **deterring violators**, and **confidence building**. Their goal is to raise the costs of non-compliance, give early warning of potential or actual non-compliance, and provide a sound legal basis for taking action against violators.<sup>14</sup> Their model is the arms control regime that existed between the US and the Soviet Union throughout the Cold War. Detection is a technical act that has been well executed by space systems since 1961. The remainder are political acts that are enabled by the technical systems. Thus, space-derived transparency, a staple of arms control between the United States and the Soviet Union throughout the Cold War, has become a standard in an era of increased availability of high-resolution images.

The yearbook chapter by Bhupendra Jasani, a professor in the Department of War Studies, Kings College in London, entitled *Remote Monitoring From Space: The Resolution Revolution*, argues that modern commercial satellite systems can provide the means to verify arms control agreements and monitor crisis areas to prevent escalation to armed conflict.<sup>15</sup> Andrew Rathmell's, Executive Director of the International Center for Security Analysis, chapter entitled *The Information Revolution and Verification*, provides an overview of the important effects of information and communication technology (ICT) on verification and the possible dividends that new ICT advances might bring through greater access to commercial "intelligence" capabilities.<sup>16</sup>

---

<sup>14</sup> Ibid.

<sup>15</sup> *The Verification Yearbook 2000*. Edited by Trevor Findlay, sub-edited by Rick Jones (VERTIC, London, 2000), chapter 13.: On-line, Internet, 9 April 2001, available from <http://www.vertic.org/yearbook/yearbook.html>

<sup>16</sup> Ibid., Chapter 14.

## **Preservationist**

In the preservationist camp, the works of Lt Col Kaspar and Lt Col McKinley, author of *When the Enemy Has Our Eyes*, are most instructive. Both acknowledge a degree of inevitability in the proliferation of space-derived information yet both of see transparency as a threat to U.S. military operations. Lt Col Kaspar examines transparency against the traditional nine Principles of War and finds that mass, maneuver, and security are the most threatened by high-resolution imagery.<sup>17</sup> For example, if an adversary can see large troop concentrations by using space imagery, discern their dispositions, and follow their movement from debarkation to the front lines, then US military operations may incur larger costs, increased casualties, and may be defeated.

Lt Col McKinley points out the attendant dangers when our adversaries are able to purchase high-resolution imagery of U.S. forces and operations. In essence, they can see us almost as well as we can see them. Given this, she, like Lt Col Kaspar, recommends ways to control space for US national security purposes and deny its use to adversaries and non-traditional users in order to protect our forces from this remote intrusion. However, she acknowledges that adversaries will likely be able to obtain space-derived information despite our best efforts. She states, “the advent of commercially available space reconnaissance data limits the United States ability to control space regardless of the weapons it chooses to develop.”<sup>18</sup>

Lieutenant Commander J. Todd Black addresses similar themes in his article, *Commercial Satellites: Future Threats or Allies?*, in the *Naval War College Review*.<sup>19</sup> His article provides an overview of some commercial space developments and their potential impact on military operations. He contends that whatever value the United States military derives from commercial satellites, our adversaries can derive the same benefit. Thus, since the commercial market is unlikely to stop a malevolent user, the US

---

<sup>17</sup> Lt Col Beth M. Kaspar, “The End of Secrecy: Military Competitiveness in the Age of Transparency.”

<sup>18</sup> Lt Col Cynthia A.S. McKinley, “When the Enemy Has Our Eyes,” *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*. Edited by Col Bruce M. DeBlois (Maxwell AFB, Ala.: Air University Press, 1999), 346.

<sup>19</sup> Lt Cmdr J. Todd Black, “Commercial Satellites: Future Threats or Allies,” *Naval War College Review*, Volume LII, no. 1, sequence 365, (Winter 1998). On-line, Internet, 14 December 2000, available from <http://www.fas.org/eye/art5-w99.htm>.

will have to amend rules of engagement to allow for direct action, if required, to prevent an adversary from using commercial space to his military advantage.<sup>20</sup>

Similar themes were explored by Major Ronald J. Babski Jr. in his Naval War College paper, *Hide Your Shape – Sun Tzu: ROE Considerations for Negating High-Resolution Commercial Imagery Satellites*.<sup>21</sup> His view is that commanders may find it necessary to take action against corporate space assets that reside in enemy or neutral territories that provide assistance to a US adversary. He proposes drafting rules of engagement based on US policy, international and domestic law, and operational considerations.<sup>22</sup>

Finally, Lt Col Larry Grundhauser highlights the national security implications of commercial high-resolution satellite imagery in his article *Sentinels Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security*.<sup>23</sup> While acknowledging that commercial space systems provide easy access to space derived information products for friend and foe, he believes the evidence isn't strong enough to suggest that it will be the difference between operational success and failure. His analysis reveals that these systems and their users are a fact of life that the military must accept. He concludes that, "... changes in the geostrategic landscape of the multi-polar world will have far more impact on U.S. national security than will any of the current or planned capabilities of commercial imagery. This analysis makes him a candidate for the synergist camp as well.

### **Synergist**

Lt Col Grundhauser's work serves as a bridge between the preservationist position and the synergist. Synergists tend to view UHR imagery as a subset of the information revolution. It contributes to global transparency and has the potential to affect stability considerations in state-to-state relations. The horaeist notion of proliferated UHR imagery is a fact and reasonable and even stronger protections

---

<sup>20</sup> Ibid.

<sup>21</sup> Major Ronald J. Babski Jr, "Hide Your Shape – Sun Tzu: ROE Considerations for Negating High-Resolution Commercial Imagery Satellites," (Newport, R.I.: Naval War College, 1999).

<sup>22</sup> Ibid.

<sup>23</sup> Lt Col Larry K.Grundhauser, "Sentinels Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," *Airpower Journal* Volume XXII, no. 4, (Winter 1998), 78.

advocated by preservationists will probably not stem the tide. In this case, the message for military planners and commanders is simple: the future is here now. Prepare!

## Terminology

The following terms will be used throughout the study:

- **CNN Effect** – An effect produced upon the public by the pictures and story coverage of mostly humanitarian crises, that have the ability to draw the nation's government into conflicts or respond to humanitarian disasters. Broadcast images potentially have the power to speed up national decision processes that may produce an intended or unintended outcome.
- **Coercion** – Persuading the target state or entity that accepting the coercer's demands will be better than resisting them. As with deterrence, it seeks to affect the behavior of an opponent by manipulating costs and benefits. Success or failure is decided by the target state's decision calculus with regard to costs and benefits (that is, the state's value for its existing position compared to its [lower] value for its position if it makes the demanded concessions). When the benefits that would be lost by concessions are outweighed by the probability of attaining these benefits by continued resistance and the probability of suffering these costs, the target concedes.<sup>24</sup>
- **Deterrence** – A theoretical construct that cannot be proved nor disproved. Essentially it is the prevention of action by fear of consequences. It may be a state of mind brought about by the existence of a credible threat of unacceptable counteraction.<sup>25</sup>
- **Non-governmental Organizations (NGO)** – Transnational or national organizations of private citizens that may be professional associations, foundations, multinational businesses, or simply groups with a common interest in humanitarian assistance activities (development and relief). It is a term normally used by non-US organizations. Similar US organizations are sometimes referred to as Private Voluntary Organizations or PVOs.<sup>26</sup> Many of these groups may maintain a consultative status with the Economic and Social Council of the United Nations.

---

<sup>24</sup> Robert Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, New York: Cornell University Press, 1996), 21.

<sup>25</sup> Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* (June 2000 as amended), 136.

<sup>26</sup> *Ibid.*, 331.

- **Transparency** – Deliberately revealing actions. The opposite of secrecy. Ideally, it is a choice, encouraged by changing attitudes about what constitutes appropriate behavior in the international environment. It may be voluntary or involuntary disclosure. It amounts to regulation by revelation. It is spreading because of two other trends: democratization and globalization.<sup>27</sup>

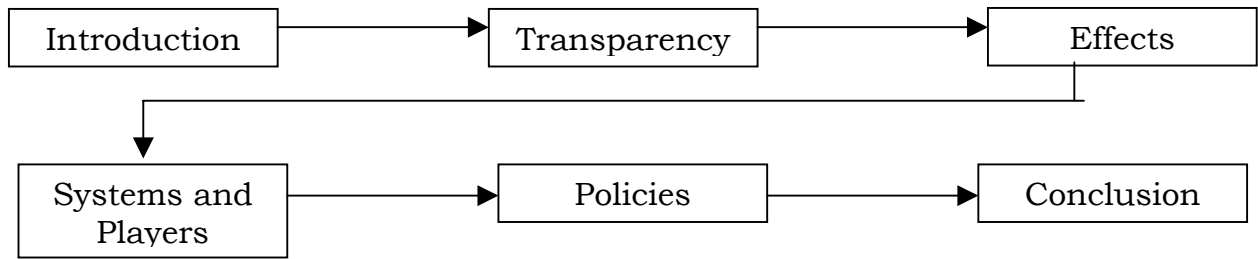
Transparency as a concept is a nebulous work in progress – space-derived transparency is only one component of it. For the purposes of this study it is important to understand what space-derived transparency is, the systems that make it possible, the players who use and might feel threatened by it, and the policies that might be used to temper effects from it. From there, we can compare the potential pros, cons, and effects to those of the so-called CNN and WWW effect within the context of the various camps.

## **Expository Roadmap**

This study is designed to educate the reader about the trend towards global transparency – it is focused on space-derived transparency’s potential effect on US policy. Chapter 2 defines transparency and space-derived transparency, identifies transparency components, and lays out some arguments for and against space-derived transparency. Chapter 3 addresses the CNN and WWW Effects, fleshing out the arguments that appear to parallel those related to space-derived transparency. It also touches on some benefits that might be gained or the influence space-derived transparency might have on foreign and security policy. Chapter 4 is about the “systems” that make space-derived transparency work. It addresses how ultra high-resolution remote sensing images are acquired, by whom, and some ways they might use these images. Chapter 5 deals with “policies” the US government might or has pursued to regulate space-derived transparency. Finally, Chapter 6 provides some general conclusions and recommendations on how the United States might, if required, foment policies to address its security concerns in a transparent world.

---

<sup>27</sup> Ann Florini, "The End of Secrecy."



Because time and space are key factors, this methodology is focused on space-derived transparency from remote-sensing satellites and their possible effect on US policy. It will not directly address issues related to space weaponization or force application from space. This work will not address the electric issues associated with space power development as an adjunct for a separate United States Space Force. This study cannot hope to address the myriad of process and analytical issues, such as NIMA's Tasking, Processing, Exploitation, and Dissemination (TPED) processes related to space-derived data and information products. All of these are topics worthy of detailed exploration and I hope others will take on this work.

This study intends to educate readers about the trends related to space-derived transparency, the users, its components, and some of the effects it might have on US policy. The study is a theoretical exploration of space-derived transparency. The technical exploration is being conducted in other venues such as the United States Air Force Space Command sponsored *Schriever 2001* wargame. Such technical explorations should produce some important lessons for policy development and the conduct of national security operations in a transparent world. As the military likes to protect secrets, the military's tendency is to take actions to protect itself from exposure in order to preserve mass, maneuver, and surprise – sources of military power in conflict.

The trends show that commercial space and information systems will play a bigger role in creating greater transparency – perhaps posing risks to national security. Malevolent and benevolent users are exploiting these tools now. What impact it may have on US policy and what might be done to mitigate it are areas to be explored. The next chapter examines transparency in greater detail.

## Chapter 2

# TRANSPARENCY AND SPACE-DERIVED TRANSPARENCY

*. . . as globalization gives people an ever greater stake in knowing more about what is going on in other parts of the world, and as technology makes such knowledge easier to attain, transparency would appear to be the ineluctable wave of the future.*

—Dr. Ann M. Florini, *No More Secrets*

*Globalization, which has drawn our economic and security interests closely together, is an inexorable trend in the post-Cold War international system.*

—A National Security Strategy for a Global Age

Information technologies such as the Internet, news wire services, and international television news organizations like Cable News Network (CNN) and British Broadcasting Corporation (BBC), among others, have seemingly made the world smaller. We are almost instantly aware of an earthquake in Afghanistan, the current flood stage of the Mississippi River at Davenport, Iowa, and the forced entry of Chinese soldiers onto a US aircraft in their territory. We have a seemingly insatiable need to know what is happening in the world and what is being done to respond. Areas of the world once denied by national borders, repressive governments, and even remoteness are opening up to provide and receive information.

Some of this information comes via traditional means – official government sources and newsgathering. Today, however, much more of this information is gathered and reported by ordinary people and by non-governmental organizations who employ a variety of means to “capture” the essence of a situation. One modern means traditionally available only to governments now being employed by the media, NGOs, and other trans-

national actors is space-based remote sensing systems. Commercially available high-resolution images portend a new way to empower non-traditional groups with tools on par with most governments. The combination of people, non-governmental groups, and advanced sensing and information technologies has made the world more transparent. This trend will continue.

## **Purpose**

This chapter defines transparency, space-derived transparency, and the components of transparency. It also examines the arguments of the horaeist and preservationist camps in favor of and against (space-derived) transparency.

## **Transparency**

*Increasingly, in issues ranging from security to commerce to economics, transparency is the preferred means of enforcement.*

—Dr. Ann Florini, *No More Secrets*

*The most likely environment the US military will face in the near future is information transparency where anyone can keep tabs on the actions of everyone else.*

—Lt Col Beth Kaspar, *The End of Secrecy: Military Competitiveness in the Age of Transparency*

**What is transparency?** It depends on whom you ask. For horaeists, it is the opposite of secrecy. This openness allows observers to better read behavior and actions but still cannot help them divine true intent. Although conceptually designed to expose corruption and malfeasance, as a horaeist concept transparency is by their definition a choice encouraged by changing attitudes about what constitutes appropriate behavior in the international environment.<sup>28</sup> It amounts to “regulation by revelation” in which violators of laws, treaty, and agreements are exposed and held accountable by individuals, groups, and governments for their misdeeds. It is spreading because of two

---

<sup>28</sup> Dr Ann Florini. "The End of Secrecy," 50.



other trends: democratization and globalization.<sup>29</sup> Transparency plays a role in political policy formulation, economic development, environmental monitoring, arms control verification and monitoring, military operations, and humanitarian relief.<sup>30</sup>

For preservationists, transparency can be an unwarranted and potentially threatening release of information that may harm national security. It is becoming more difficult to shield “national security” information not only because of technology proliferation and improvements, but also because of “spreading norms about who is entitled to have access to what information.”<sup>31</sup> As a result of increasing democratization throughout the world, new players such as commercial ventures and non-state actors like terrorist groups and “benevolent” non-governmental organizations are in some cases demanding, and gaining, access to previously restricted information. Closed nations, organizations, and groups are now, perhaps unknowingly, opened up for inspection by outsiders.

For both camps, transparency appears to be centered around “exposure” because events or actions are now more easily surveilled or discovered. According to Lieutenant Colonel Kaspar, a preservationist, “transparency is the result of the worldwide explosion in quantity and quality of information available to the general user, the accessibility of the information, and the affordability in acquiring any data product desired [emphasis added].”<sup>32</sup>

### Analyzing the Camps

For horaeists, ideally governments, non-governmental ventures, groups, and individuals will voluntarily disclose information about themselves. However, it appears that horaeists recognize that these entities appear to require an incentive to “voluntarily” disclose information about themselves, particularly information that might cast them in a bad light or potentially compromise a tool that underpins their security policy. For example, the Chemical Weapons Convention bans “development, production,

---

<sup>29</sup> Ibid.

<sup>30</sup> Ann M. Florini and Yahya A. Dehqanzada. “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites.”

<sup>31</sup> Ibid.

<sup>32</sup> Lt Col Beth M. Kaspar, “The End of Secrecy? Military Competitiveness in the Age of Transparency,” vi.

stockpiling, retention, direct or indirect transfer, and use of chemical weapons.”<sup>33</sup> According to the terms of the treaty, all signatories must declare what materials, manufacturing capability, and weapons stockpiles they have. Since this treaty went into effect in 1999, the biggest surprise of this “voluntary” declaration was India’s admission of a previously “unknown and undisclosed” chemical weapons program. Voluntary disclosure requirements are now a standard fixture in arms control and even environmental treaties. However, it is not limited to these two areas.

Since the end of the Cold War, horaeists tend to think about transparency in terms of the exposure of public and private corruption. While corruption has been a part of most governments throughout history, Fredrik Galtung of Transparency International, an NGO dedicated to empowering “civil society” to participate in efforts to fight corruption, claims that the 1990s yielded a “corruption eruption” because of:

- Deregulation and privatization of markets in former Soviet bloc countries,
- The mushrooming of opportunities for international economic transactions between innumerable actors worldwide, and
- The acceleration and relative democratization of information technologies that can move information and money instantaneously and discreetly around the planet.<sup>34</sup>

While TI’s name and mission to provide “greater” transparency seems to co-opt and narrow transparency’s meaning, it really represents one sub-area of traditional transparency writ large. As stated earlier, the core of transparency is “openness” whether political, economic, environmental, arms control, etc. Exposure of political or economic corruption to the body politic is consistent with traditional transparency’s aim of “opening” up governmental and non-governmental processes to inspection. The pure horaeist view argues that such openness should be liberating in that it potentially resolves security dilemmas and raises the threshold for conflict by replacing uncertainty with openness.

---

<sup>33</sup> Dr Florini, “The End of Secrecy,” 54.

<sup>34</sup> Fredrick Galtung, “A Global Network to Curb Corruption,” in *The Third Force: The Rise of Transnational Civil Society*. Edited by Ann M. Florini (Washington D.C.: Carnegie Endowment for International Peace, 2000), 18.

Such “openness” can be threatening. Even some horaeists recognize this. Dr. Florini notes that a cautious approach is better than an unrestrained reliance on openness. This acknowledgement should offer some comfort to preservationists. According to Dr. Florini, there are four significant reasons to move cautiously. These are:

- **In the absence of universally shared, or at least mutually compatible, norms, transparency will aggravate conflict.** Consider Israel’s undeclared nuclear capability. “Civil society” needs to be savvy enough to recognize that the costs of enforcing compliance with non-proliferation regimes are less than the cost to Israel’s existence if it disarms. It is better to politely ignore this “violation” of the nuclear non-proliferation treaty rather than incite a regional war.
- **Some secrets are legitimately worth protecting.** What happens if a corporation reveals his business strategy to competitors? What might have happened if the US had announced to Sadaam Hussein that it intended to counterattack in both Kuwait and through the western desert?
- **Information can easily be misused or misinterpreted.** As transparency reads behavior rather than minds, it cannot reveal true intent. It is easy for groups with an agenda to use information in unintended ways. For example, on 8 May 2001, the US Secretary of Defense publicly announced that the Air Force would become the executive agent for all US military space activity. Additionally, he announced that a new four-star general billet would be created for Air Force Space Command. Media reports that night reported instead that the Secretary had initiated a plan to “weaponize” space, sparking protests from arms control groups and opposition politicians.
- **Even if conditions are right, transparency does not always work.** There is no guarantee that public revelation of malicious behavior will cause a bad actor to behave. In closed societies where the government controls the means of information and suppresses opposition, the public cannot be mobilized to take action when such behaviors come to light.<sup>35</sup>

These reasons are significant enough to give thoughtful horaeists pause as they develop and employ tactics for greater transparency. Preservationists naturally are concerned about the prospect that transparency groups will give little thought to the consequences of their actions and spark a conflict or that they will reveal something that compromises national security and freedom of action. Beyond threatening America’s ability to foment sound policies, preservationists fear, for example, that imprudent actions on the part of horaeists threaten the US military’s ability to achieve mass, maneuver

---

<sup>35</sup> Dr. Ann Florini, *The End of Secrecy*, 57.

forces, and surprise the enemy. Additionally, Lieutenant Colonel Kaspar notes that “transparency may also exacerbate tensions in Coalition politics and military execution” by making politically sensitive and troubled partners reluctant to support offensive action.<sup>36</sup>

For horaeists, such preservationist concerns are strawmen – their *real* concern is about preserving their own power base. Dr. Florini notes that, “yet precisely because transparency represents such a profound change – both in the distribution of power and the way in which it is exercised – its spread has provoked resistance from some quarters.”<sup>37</sup> If knowledge is power, then preservationists seek to prevent disclosure of information about them. However, having determined that release of closely held information known about others could provide them an advantage, preservationists will sometimes release this information. Yet, preservationists will tend to do this only when it will have a minimal impact on their own security.

As Andrew Rathmell notes in the *Verification Yearbook*, “national intelligence agencies that are reliant on their own sources and methods will always be reluctant to share documentation and intelligence.”<sup>38</sup> Preservationists are almost always concerned that release of any information they know about others might reveal collection sources and methods therefore, they are generally reluctant to release any information unless they can be reasonably certain it will not threaten their security or power. Sometimes this information is released to compel or prevent action. It may also be selectively released to embarrass or damage the credibility of national, private, or other entities.

In order to gain some advantage, governments, commercial ventures, and transnational groups have almost always used transparency. Horaeists recognize transparency’s potential power in encouraging compliance with laws and treaties, compelling or dissuading an adversary action, or simply to gain political, economic, informational, or military advantage. They argue that instead of relying on great powers or governments, regimes can be checked by official and unofficial actors networked to

---

<sup>36</sup> Lt Col Beth M. Kaspar. “The End of Secrecy? Military Competitiveness in the Age of Transparency,” 47.

<sup>37</sup> Ibid., 50.

<sup>38</sup> Andrew Rathmell in *The Verification Yearbook 2000*. Edited by Trevor Findlay, sub-edited by Rick Jones (VERTIC, London, 2000, chapter 14), 220.: On-line, Internet, 9 April 2001, available from <http://www.vertic.org/yearbook/yearbook.html>

collection, analytical, and high technology dissemination capabilities such as the Internet and space communications.<sup>39</sup> However, because it is the nature of most people and organizations to conceal potentially damaging or embarrassing information, legislation and other means are employed to coerce or compel “voluntary” disclosure or the information is discovered and revealed by “others.”

For the most idealistic horaeists, transparency is the means to ending global corruption and building a civil society. To the most committed preservationists, it is a potential security and power threat. Although the term “transparency” in its current form emerged after the Cold War ended, it is an idea as old as the human race – one that has been practiced in many forms, spread largely through religious institutions and inculcated, perhaps unknowingly, in diplomatic and military cultures. Anecdotal evidence lends some credibility to the horaeist argument that transparency and the expanding number of groups that benefit from it is an inevitable trend.

### **Transparency Examples**

Some general examples of voluntary and involuntary transparency include:

- Disclosure of tax returns of public officials and donor lists to political campaigns
- Publication of a local police department’s “blotter” or list of daily arrests through local media
- Freedom of Information Act requests for information related to various government activities
- In terms of classical nuclear deterrence theory, both the United States and the Soviet Union demonstrated their capabilities and intentions through flight testing of missiles, announced and unannounced nuclear testing, publication of doctrine, political statements, parades, etc. This transparency arguably reinforced the notion of mutual assured destruction and hence, enhanced each nation’s deterrent posture.
- Involuntary disclosure of military information such as the 1971 release by Daniel Ellsberg and publication of the so-called “Pentagon Papers” by Neil Sheehan in the *New York Times*.<sup>40</sup>

---

<sup>39</sup> Ibid., 226.

<sup>40</sup> "Pentagon Papers," Microsoft® Encarta® Online Encyclopedia 2001 <http://encarta.msn.com> © 1997-2001 Microsoft Corporation. All rights reserved. Officially titled "The History of the U.S. Decision Making Process in Vietnam," the Pentagon Papers were leaked in 1971 to *New York Times* reporter Neil Sheehan by Daniel Ellsberg, one of the analysts who helped write the study. The papers are a top-secret study that detailed government deceptions about United States policy in Vietnam

- Self-reporting or involuntary disclosure of violations of environmental regulations as in the case of the Three Mile Island nuclear accident on 28 March 1979 in which a partial meltdown of the reactor core resulted in the release of radioactive material.
- The 1986 Soviet policy of *Glasnost* or “openness” that for the first time allowed Soviet citizens to speak publicly through their own and western media outlets about perceptions of their government, social and political problems, and their own lives. This arguably was one of the critical factors in ending the Cold War in 1989 and bringing about the collapse of the Soviet Union through popular revolt in December 1991.
- Media reports concerning automobile deaths caused by tire failure of Firestone tires. These reports led to complete recalls of various brands of tires, 6.5 million tires in all, and a government investigation of manufacturing processes, testing procedures, and the failure of Firestone to “self-report” and take remedial action when it discovered the problem.
- The use of the Internet to connect peace and human rights activists in Serbia before, during, and after Operation Allied Force in 1999 to expose ethnic cleansing efforts. This helped fuel Serb political opposition, united it, and ultimately led to the political defeat of Serbian President Slobodan Milosevic in 2000.

These are but a few examples of the types of transparency that takes place in the world on a daily basis. Disclosure ranges from the simple such as a press conference to the more complex such as public hearings conducted by government to detailed public and private investigations of malfeasance. Freedom of information laws such as those in the United States and Britain are creating conditions for sub-state actors, non-governmental organizations, and others to obtain information – the result is greater transparency in these societies.

If open, democratic societies tend to have more transparency, what means are available to pry open the doors of closed societies such as North Korea and China? The answer to some extent is advanced information technologies such as the Internet and the use of formerly restricted and classified technologies such as ultra high-resolution space-derived imagery. However, the complexity associated with the confluence of the four components of space-derived transparency must be understood first.

---

dating back to the Truman administration. Their publication resulted in a Supreme Court ruling on freedom of the press.

## Transparency Components

According to Lieutenant Colonel Kaspar, “technology diffusion is moving our society from an environment wherein nation-states have controlled the dispersion of advanced technology to a more information open, anarchic global society.”<sup>41</sup> This suggests that the United States in particular may find itself helpless before an onslaught of well-equipped entities opposed to US global interests – obstructing us at every turn. This state of affairs exists because more non-governmental entities avail themselves of the commercial space images yielding a six-fold increase in commercial space information revenues. This increase is the result of four factors:<sup>42</sup>

- The rapid shift in communications traffic due to the convergence of computer and communication technology.
- Changes in international space policy due largely to deregulation of telecommunications and new frequency spectrum allocations for commercial space ventures.
- The growing dual use aspect of information technology systems like the Global Positioning System (GPS).
- Fundamental changes in the processes and cost of satellite manufacturing and expanding global demand for satellite services.

As Lieutenant Colonel Kaspar notes, “the nearly unavoidable result of globalization of economy, our open society, and the evolving dual use nature of military and commercial technology, the US military veil of secrecy is becoming more transparent.”<sup>43</sup> However, as a preservationist, she views this result as a threat to military operations.

Based on analysis of transparency related literature, the means of space-derived transparency in the modern world appears to have four components:

- **Information Technologies** – Internet, communication satellites, and terrestrial communication architectures
- **Commercialization of previously restricted or classified technologies** – policy changes such as the Commercial Remote Sensing Act of high resolution remote sensing systems, sophisticated information gathering

---

<sup>41</sup> Lt Col Beth M. Kaspar, “The End of Secrecy? Military Competitiveness in the Age of Transparency,” 2.

<sup>42</sup> Ibid.

<sup>43</sup> Ibid., 25.

technologies (e.g. hidden microphone and video systems).<sup>44</sup> This is partially the result of changes in satellite manufacturing processes that allow satellites to be produced in an assembly line fashion rather than building each one as a unique system.

- **Governments, militaries, non-governmental organizations, and transnational actors** – Institutions, businesses, and small groups with a common heritage, values, etc. that potentially could make use of information and previously restricted or classified technologies.
- **Political change (democratization) resulting in greater openness** – indicated by proliferation of newsgathering, increased access for and support of NGOs, and national and global societal awareness and political activity.<sup>45</sup>

These four components are necessary for transparency and its components to exist but are hardly sufficient. For example, government preservationists in an “open” democratic society may refuse to work with NGOs or may establish regulatory policies, like the US government’s shutter control policy, that limit or restrict the sales of space-derived information to certain groups. In some cases, specialized imagery products may be beyond the imaging or production capability of a commercial space vendor. Or, a myriad of sub-component activities and actions may be limiting or liberating factors in (space-derived) transparency.

What appears certain is the confluence of these components has resulted in greater transparency and for the purposes of this study, these four factors are necessary components of space-derived transparency. What is clear is that transparency is a trend in world affairs and that space-derived transparency is becoming a player in providing transparency.

## **Space Derived Transparency**

*Spysats are widely credited with stabilizing the relationship between the superpowers and contributed to the rising levels of transparency that played a role in ending the Cold War*

—Lt Col Pete Hays, *Transparency, Stability, and Deception: Military Implications of Commercial High Resolution Imaging Satellites in Theory and Practice*

---

<sup>44</sup> Space Commercialization Promotion Act of 1996 (HR3936): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/hr3936.html>

<sup>45</sup> Andrew Rathmell in *The Verification Yearbook 2000*, 217.



*The element of strategic transparency provided by readily available commercial images does far more for maintaining peace than it does for sharpening means of attack.*

—E. Marshall, *Space Cameras and Security Risks*

If transparency is the “voluntary” disclosure of information about government, commercial ventures, groups, and individuals, then **space-derived transparency** is the use of space technologies to image and listen, and to task, process, exploit, and disseminate space-derived information to provide transparency. During the Cold War, imaging satellites provided access to “denied” areas within the Soviet Union, China, Warsaw Pact nations, and other areas. For example, the CORONA imaging satellite program, enjoying its first successful film return (after 12 previous failures) in August 1960, collected more than 800,000 images in 10 years.<sup>46</sup> This clandestine space imaging system made it possible for the United States to debunk the notion of a “missile gap” between the United States and the Soviet Union.

Prior to 1985, space-derived transparency was largely the exclusive domain of well-resourced governments. Today it is a free-market arena for those with fewer resources such as small nations, businesses, and non-governmental organizations. Governments, groups, and individuals benefit from communications satellites that can instantly broadcast information globally, the increasing proliferation of commercial space derived imagery, liberalized policies enabling commercial space development, and finally, the demand by governments, non-governmental organizations, businesses and others for access to space and information technologies. Retired General Thomas S. Moorman, Jr. notes, “remote sensing will become an essential part of the information revolution.”<sup>47</sup>

---

<sup>46</sup> Robert A. McDonald, “Corona, Argon, and Lanyard: A Revolution for US Overhead Reconnaissance,” in *Corona Between the Sun and the Earth: The First NRO Reconnaissance Eye in Space*, Robert A. McDonald, ed. (Bethesda, Md.: American Society for Photogrammetry and Remote Sensing, 1997), 70-71; and National Reconnaissance Office, Historical Imagery Declassification Fact Sheet, online, Internet, 9 April 2001, available from <http://www.odci.gov/corona/facts/htm>.

<sup>47</sup> General Thomas S. Moorman, Jr., USAF (ret), “The Explosion of Commercial Space and the Implications for National Security,” *Airpower Journal*, (Volume XIII, No.1, (Spring 1999), 16.

## **Space-Derived Transparency and the Camps**

If transparency is an increasing trend, then the increasing number of commercial space vendors providing UHR remote sensing imagery is making space-derived transparency a likely trend. Where did space-derived transparency get its start? Arguably it began with President Dwight D. Eisenhower's "open skies" proposal to the Soviet Union. "Open skies" amounted to a cross between traditional and what would become space-derived transparency in that the United States and USSR would provide each other blue-prints of their respective military bases and forces and then, in a preview of what would become space-derived transparency, permit frequent inspection overflights of each other's territory. The Soviet Union refused the offer.<sup>48</sup> However, with the launch of Sputnik in October 1957, perhaps unintentionally, the Soviets established a precedent for space overflights thus opening the door for unfettered access to previously closed areas via space-based imaging systems. The CORONA satellite program, launched in August 1960, was the progenitor of all space-derived transparency systems and processes.

Space-based land remote sensing technologies thus became an essential feature of arms control efforts and later evolved to support national policy development through intelligence gathering and provide a unique means of confidence and security building measures (CSBM). For example, the UN Disengagement Observer Force in the Sinai allowed the United States to provide satellite imagery to Israel and Egypt every two weeks to provide a degree of transparency about the force status of the opposing forces in a CSBM effort.<sup>49</sup> The positive effect of this is something horaeists, preservationists, and synergists can claim as a responsible and beneficial use of space-derived transparency.

Can such positive effects still be realized in the emerging 21<sup>st</sup> century international security environment? Horaeists believe that it can because of democratization and globalization in the wake of the Cold War as heralded by the Soviet Union's collapse. They see "public value of the free flow of [space-derived] information" whether government provided or sold by industry to those who can afford

---

<sup>48</sup> McDougall, Walter A. ... *The Heavens and the Earth: A Political History of the Space Age*. (New York: Basic Books, 1985), 127.

<sup>49</sup> Gustav Hagglund, "Peace-keeping in a Modern War Zone," *Survival* (May-June 1990), 235.

it.<sup>50</sup> If widely available, it can be used to address humanitarian needs and allow non-governmental groups the opportunity to mitigate crises. It is the latter possibility that causes consternation among the preservationists because armed with UHR space imagery, unregulated non-governmental organization involvement in traditional state activities:

- May create friction in state-to-state relations and military operations
- Forces governments to assume corporations, small groups, or individuals with malevolent intent may be an equivalent “space power”
- Requires governments to view such transparency as a threat and thus develop control policies to contain the perceived threat through non-destructive or administrative means that may ultimately be ineffective.

What precipitated these horaeist hopes and preservationist concerns? Essentially, they arose due to changes in US government policy and a quest by commercial ventures to reap potential profits. According to Dr. Florini:

Imagery from high-resolution satellites is becoming available now not only because technology has advanced to the point of making the imagery a potential source of substantial profits, but because governmental policies permit, and indeed encourage, such satellites to be operated.<sup>51</sup>

General Thomas S. Moorman agrees in large part with this assessment but adds that because of the US military’s success using commercial space imagery during the 1991 Gulf War the United States recognized the potential for commercial space imagery. He notes that because the French commercial imagery satellite SPOT had a 10 meter resolution capability compared to the US LANDSAT system with 30 meter resolution, that the US had to take action.

For [this] reason there existed legitimate concerns that, without a policy change which removed resolution restrictions, the United States would lose out in the market place for multi-spectral satellite imagery, especially since the French continued to invest in the higher resolution SPOT system as well as the Helios military reconnaissance system.<sup>52</sup>

---

<sup>50</sup> Ann M. Florini and Yahya A. Dehqanzada. “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites.”

<sup>51</sup> Ibid.

<sup>52</sup> General Thomas S. Moorman, Jr., USAF (ret), “The Explosion of Commercial Space and the Implications for National Security,” 15.

Given the concerns related to maintaining a technological edge as well as opening a new market, the US Congress took legislative action in the form of the 1992 Land Remote Sensing Act. Prior to the passage of the 1992 act, space-derived transparency allowed well-resourced national governments like the US, Russia, India, and France to see deep inside denied areas. With passage, Congress found that, “. . . commercialization of land remote sensing should remain a long-term goal of the United States.”<sup>53</sup> This act and the 1994 Presidential Decision Directive 23 (PDD-23), set the course for the commercialization of formerly restricted space imaging technologies.

Congress and the executive branch were concerned about security aspects related to commercial space. Thus PDD-23, a classified document set some prudent guidelines in an effort to control dissemination to potential malevolent users of UHR imagery. Among these is something euphemistically known as “shutter control.” Essentially it is a policy that can direct commercial imagery vendors to turn off imagers during certain periods, restrict imaging of select nations or locations, or track or restrict the sales of specialized imagery to certain groups. This will be explored more in Chapter 5.

With the passage of the 1992 Land Remote Sensing Act, pundits predicted an explosion in the growth of private space imaging initiatives. Dr. Florini cites four reasons for the predicted growth:

- The collapse of the Soviet Union.
- Predictions that demand for remote sensing data would grow exponentially.
- Advances in panchromatic, multi-spectral, and hyper-spectral data acquisition, storage, processing, and electronic dissemination of imagery.
- Active US government support for commercialization.<sup>54</sup>

In addition to her reasons, the 1992 Act was the result of inputs from the newly declassified National Reconnaissance Office (NRO) and NIMA. The NRO believed they could maintain their technological edge while NIMA found that commercial imagery could satisfy many customer requirements. NRO Deputy Director Jimmie D. Hill

---

<sup>53</sup> United States Code Title 15, Chapter 82, Land Remote Sensing Policy, derived from Section 1 of Public Law 102-555 cited as the Land Remote Sensing Policy Act.: on-line, Internet, 14 December 2000, available from <http://www.geo.arc.nasa.gov/sge/landsat/15USCch82.html>.

<sup>54</sup> Ann M. Florini and Yahya A Dehqanzada, “No More Secrets? Policy Implications of Remote Sensing Satellites.”

suggested in a 1991 memo that it was in the interest of the United States to be the first to loosen the control strings on commercial UHR imagery collection “so that it could dominate the industry and give the US government some control over the collection and distribution of data.”<sup>55</sup> Other reasons included concerns related to the defense industrial base and its ability to provide systems and capabilities in sufficient quantity to satisfy the increasing demand for imagery.

Additionally, CNN and other companies were floating an idea to develop their own satellite known as Mediasat to provide them with UHR imagery that the government couldn’t turn off for capricious reasons. Such a system could be the spark for commercial imagery sales to non-media companies, challenge the technological edge enjoyed by the NRO, and bypass traditional classification restrictions associated with UHR imagery derived from national technical means. With passage of the law, the government had the opportunity to regulate the market and incrementally introduce higher resolution remote sensing products.

While commercial space hasn’t “exploded” as was once predicted by knowledgeable space business observers, the more than 20 commercial imaging satellites orbiting earth today represents a ten-fold increase in commercial capability since 1991 and they generate revenues from commercial imagery sales between \$2.6 - \$5 billion a year.<sup>56</sup> Teal Group Corporation, an aerospace and defense market analysis firm, forecasts that by 2010, 43 commercial imaging satellites valued at \$3.62 billion will be available for tasking by a larger number of users.<sup>57</sup>

As was noted earlier, transparency makes it difficult to hide information not only because technology allows us into areas we couldn’t go before but also because evolving norms about who should be able to have this information has expanded the number of players. Who will have this information will be discussed in more detail later, however, in world with a growing number of open societies, arguably anyone should be able to

---

<sup>55</sup> Gerald B. Thomas, “External Shocks, Conflict and Learning as Interactive Sources of Change in US Security Policy,” *Journal of Public Policy* 19 (Spring 1999), 113-135.

<sup>56</sup> Derived from the Current Earth Observation Satellite list of the Environmental Remote Sensing Center, (Madison, Wisc.: University of Wisconsin, 6 December 2000), online, Internet, 9 April 2001, available from <http://www.ersc.wisc.edu/ERSC/Resources/EOSC.html>.

<sup>57</sup> The Teal Group. PRNewswire via COMTEX. 23 August 2000. online, Internet, 30 April 2001, available from <http://www.fas.org/eye/000823-teal.htm>.

gain access to the information. Whoever has access to space-derived information will find themselves armed with a potentially disproportionately powerful transparency tool.

As horaeists and preservationists know, the earliest uses of space imagery was to open denied areas of communist nations, particularly the Soviet Union, to inspection. This is still true today. For horaeists bent on exposing violations of arms control and environmental agreements, this is an important capability. The 1995 declassification of CORONA imagery is proving to be a windfall for environmentalists as they employ change detection thematic mapping technology to conduct a comparative analysis between imagery from today compared with images taken in the 1960s. From this analysis, they can determine rates of deforestation, better identify environmentally sensitive areas and, in some cases, allow monitoring and advocacy groups to confront nations and industries about violations and their role in environmental degradation. Such efforts have spawned “regulation by revelation” actions within the environmental movement, actions that have been practiced within governmental arms control efforts since the 1960s (e.g. UN confrontation in the 1962 Cuban Missile Crisis).<sup>58</sup>

As preservationists have known for years, UHR images are key in intelligence gathering – it is now a critical part of the military decision making process particularly in the intelligence preparation of the battlespace. It is also important for monitoring adversary actions during the fight and assessing the effectiveness of military operations. Within the context of their “non-military” operations, horaeists are discovering the value of these images too. In addition to revealing legal and treaty violations, horaeist groups see a role for space imagery in helping governments and NGOs, “to respond quickly to sudden refugee movements, to document and publicize large-scale humanitarian atrocities, to monitor environmental degradation, or to manage international disputes before they escalate.”<sup>59</sup>

While synergists and even preservationists appreciate the potential value of UHR imagery in such operations and even laud the professed benevolence of humanitarian NGOs, the security concern still looms large. The Land Remote Sensing Policy states:

---

<sup>58</sup> Ann M. Florini and Yahya A. Dehqanzada. “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites.”

<sup>59</sup> Ibid.

The continuous collection and utilization of land remote sensing data from space are of major benefit in studying and understanding human impacts on the global environment, in managing the Earth's natural resources, in carrying out national security functions, and in planning and conducting many other activities of scientific, economic, and social importance.<sup>60</sup>

If so, then why is one- and even sub-meter resolution imagery necessary for these purposes for non-governmental activities? How does seeing an individual tree or a lone individual from space help environmentalists or further the cause of humanitarian relief organizations? Lt Commander Black captures the essence of preservationist concerns:

Given the expense involved, there are only two reasons one might insist on high-resolution satellite photos: first, that one **does not have access** to the target area, and second, that one wants to **obtain information without the knowledge** of the area's owners. Otherwise, if traditional land-survey means are available, space-based high-resolution imagery does not make sense. [emphasis added]<sup>61</sup>

The preservationist bottom line: there is simply no guarantee that UHR imagery will be used exclusively for benevolent and non-competitive purposes. Even Dr. Florini notes, "governments, corporations, or small groups could use the imagery to conduct industrial espionage, collect intelligence, plan terrorist attacks, or mount offensive military operations."<sup>62</sup> Thus, there are many reasonable critics of the horaeist position in general and of Dr. Florini's specific argument that the end-state of transparency is a transnational and civil society – one that is completely open. While vocal horaeist idealism seems to capture the attention and ire of preservationists, Dr. Florini's approach suggests and her own admission recognizes that transparency is not a panacea for resolving all global problems.

Since some of the players, non-governmental organizations and transnational actors, especially when armed with advanced technologies and UHR imagery can be

---

<sup>60</sup> United States Code Title 15, Chapter 82, Land Remote Sensing Policy, derived from Section 1 of Public Law 102-555 cited as the Land Remote Sensing Policy Act.: on-line, Internet, 14 December 2000, available from <http://www.geo.arc.nasa.gov/sge/landsat/15USCch82.html>.

<sup>61</sup> Lt Cmdr J. Todd Black, "Commercial Satellites: Future Threats or Allies," *Naval War College Review*, Volume LII, no. 1, sequence 365, (Winter 1998). On-line, Internet, 14 December 2000, available from <http://www.fas.org/eye/art5-w99.htm>.

<sup>62</sup> Ann M. Florini and Yahya A. Dehqanzada, "No More Secrets? Policy Implications of Commercial Remote Sensing Satellites."

dangerous, then the US military, as the entity charged with protecting national security, must logically fall into the critic's camp.<sup>63</sup> How then has and can space-derived transparency be used?

### **Examples of Space-Derived Transparency**

Some space-derived transparency examples include:

- January 1985 – Ocean Earth Corporation releases SPOT imagery of Iraqi attempts to flood the main combat zone between Iran and Iraq near Basra.
- April 1986 – ABC News followed by other news organizations broadcast Landsat and SPOT imagery of the burning Chernobyl nuclear reactor.
- August 1986 – major news organizations use and report on SPOT imagery of Soviet nuclear and directed energy weapons testing facility at Semipalatinsk.
- April 1987 – Pentagon publication of “Soviet Military Power” briefing book includes imagery of the Krasnoyarsk large phased array radar, the Chernobyl nuclear accident, and the military airfield at Etorofu Island.
- July 1987 – ABC News combined SPOT, Landsat and TIROS imagery of the Persian Gulf to provide the first implementation of synthetic three-dimension perspective imagery.
- October 1988 – *The Chicago Tribune* used SPOT imagery of an area in the Ural Mountains which remained abandoned after a major nuclear accident in 1957.
- March 1990 – *Space News* publishes analysis by Toshimbumi Sakata of Tokai University of SPOT imagery of North Korean nuclear weapons facilities.
- August 1990 – Soviet satellite photos taken five weeks after the 2 August 1990 Iraqi invasion of Kuwait suggests the US government exaggerated the scope of Iraq's threat to Saudi Arabia.
- Summer 1992 – Bhupendra Jasani of Kings College in London presents analysis of SPOT imagery of the Nevada nuclear test site, Greenham Common, Sikhany chemical weapons complex, and the Tooele Army Depot at the Immenstaad Conference in Bochum, Germany.
- April 2001 – CNN broadcast of commercial satellite imagery of a damaged US EP-3 Aries II surveillance plane on the runway of a Chinese military base. Later images showed a tarp over the back of the aircraft blocking the view from overhead sensors and a line of military trucks next to the plane.<sup>64</sup>

---

<sup>63</sup> Ibid.

<sup>64</sup> “Medium-Resolution Applications,” Federation of American Scientists Public Eye.: On-line, Internet, 9 April 2001, available from <http://www.fas.org/eye/medres.htm>.



These examples illustrate that media organizations, academics, and NGOs are accepting that space-based remote sensing and information systems are increasingly important to transparency. They represent only a microcosm of what is possible. In 1999, David Albright, Corey Gay and Khidhir Hamza of the Institute for Science and International Society (ISIS) asked, “what if the public or the International Atomic Energy Agency (IAEA) had overhead (remote sensing) imagery?”<sup>65</sup> They explored this question in an article regarding the illegal development of the Iraqi Al-Tuwaitha nuclear site, which remained undiscovered by the IAEA until overhead imagery was made available by the United States and only after its destruction during the 1991 Gulf War.<sup>66</sup> Their point: would the IAEA have acted earlier if it had access to UHR imagery?

There is no practical way to test their thesis. However, it the question at the heart of horaeist hopes for and preservationist fears of transparency. Elliot Pulman, senior vice-president of the Space Foundation notes, “I think there are some parallels [between commercial remote-sensing images] to the Global Positioning System. People are using GPS in ways no one expected. People are going to find some very novel ways to use this.”<sup>67</sup> General Moorman supports this position stating:

Images on demand, including three dimensional products linked to the databases of other geographic information systems and mensurated and indexed through GPS, will become the order of the day. The only question is not whether this will happen but when.<sup>68</sup>

“When” appears to be now. For example on 11 January 2000, John Pike, former spokesman for the Federation of American Scientists, posted 1-meter UHR imagery of North Korea’s Taepodong Missile Test Site at Rodong in an effort to stir public debate over the US government’s position on the threat posed by their missile program. Comparing it to the Kennedy Space Center, he called it “primitive” and “the mouse that

---

<sup>65</sup> David, Albright, Corey Gay, and Kidhir Hamza, “Development of the Al-Tuwaitha Site: What if the Public or the IAEA had Overhead Imagery?” Institute for Science and International Security (26 April 1999).: On-line, Internet, 9 April 2001, available from <http://www.isis-online.org/publications/iraq/tuwaitha.html>.

<sup>66</sup> Ibid.

<sup>67</sup> Jonathan Lipman, “Views You Can Use . . . or Abuse?” Space.com (5 January 2000): On-line, Internet, 14 April 2001, available from [http://www.space.com/business/technology/business/ikonos\\_photosale\\_000105.html](http://www.space.com/business/technology/business/ikonos_photosale_000105.html).

<sup>68</sup> General Thomas S. Moorman, Jr., USAF (ret), “The Explosion of Commercial Space and the Implications for National Security,” 16.

roared.”<sup>69</sup> Noting the absence of rail links, paved roads, and staff housing, Mr. Pike argues the North Koreans “are developing an unreliable missile to deter us rather than a reliable missile to attack us.”<sup>70</sup>

More shocking to preservationists, he claimed that with UHR imagery, people do not have to be experts to analyze the images saying “. . . people can tell the difference between a concrete road and a dirt road.”<sup>71</sup> However, imagery lacks context and cannot reveal the behavior or actions without expert analysis. Frank J. Gaffney Jr., the director of the Center for Security Policy in Washington D.C. notes that Mr. Pike was naïve and that only a complete evaluation by trained analysts could reveal the true menace of the facility. Referring to FAS statements about the “unimpressive” state of the Rodong site, Mr. Gaffney noted, “. . . if crude will do, then we’re fools to ignore capabilities that have the potential to do us grave harm.”<sup>72</sup> Thus, commercial UHR imagery in the context of space-derived transparency is a source of friction between the two camps. Figure 2-1 captures some of the key horaeist and preservationist arguments for and against transparency and space-derived transparency.

---

<sup>69</sup> William J. Broad, “Spy Photos of Korea Missile Site Brings Dispute,” *The New York Times*, 11 January 2000.

<sup>70</sup> Ibid.

<sup>71</sup> Tabassum Zakaria, “US Group Puts N. Korea Missile Site Pictures on Web,” *Reuters*, 11 January 2000.

<sup>72</sup> Ibid.

**Table 1. Transparency Camp Summary<sup>73</sup>**

CAMPS	PROS		CONS	
	Traditional	Space-Derived	Traditional	Space-Derived
<b>Horaelist</b>	<ul style="list-style-type: none"> <li>Democratization and globalization may lead to greater openness</li> <li>Potentially changes behavior and actions of state and non-state actors</li> <li>May lead to a transnational civil society</li> <li>Empowers non-governmental bodies -- allows for greater regulation by revelation</li> <li>Spurs corrective action by the body politic</li> </ul>	<ul style="list-style-type: none"> <li>Opens previously denied areas to inspection and revelation</li> <li>Potentially provides greater capability to discover violations</li> <li>Potentially resolves security dilemmas by enabling Confidence and Security Building Measures</li> <li>Non-governmental groups may have the same capabilities as governments -- may be easier to detect and respond to humanitarian disasters</li> </ul>	<ul style="list-style-type: none"> <li>In the absence of universally shared, or at least mutually compatible, norms, transparency will aggravate conflict.</li> <li>Lack of skilled analysts may cause information to be easily misused or misinterpreted.</li> <li>Even if conditions are right, transparency does not always work.</li> <li>Preservationist security concerns could thwart transparency efforts</li> </ul>	<ul style="list-style-type: none"> <li>Potentially empowers malevolent civil society groups such as terrorists</li> <li>Cost</li> <li>Inability to analyze images could lead to misinterpretation or misuse</li> <li>Security concerns may spur premature and ill-advised government "direct" action (i.e. destruction) or other policies (e.g. shutter control) that may unnecessarily restrict access to the commercial space technology and space-derived information products</li> </ul>
<b>Preservationist</b>	<ul style="list-style-type: none"> <li>Empowers policy makers and military operations</li> <li>Potentially changes behavior and actions of state and non-state actors</li> <li>Provides opportunities for public and private diplomacy to work to mitigate crises</li> </ul>	<ul style="list-style-type: none"> <li>Opens previously denied areas to inspection and revelation</li> <li>Essential to intelligence gathering and policy formulation</li> <li>Better capability to provide Confidence and Security Building Measures</li> <li>Provides an advantage to strategists and military planners</li> <li>Essential tool in arms control and military operations</li> </ul>	<ul style="list-style-type: none"> <li>In the absence of universally shared, or at least mutually compatible, norms, transparency will aggravate conflict.</li> <li>Some secrets are legitimately worth protecting.</li> <li>Information can easily be misused or misinterpreted.</li> <li>Even if conditions are right, transparency does not always work</li> <li>Empowered non-governmental organizations may intrude into areas once the purview of governments</li> <li>Potentially leads to increased nuisance suits by NGOs against governments and corporations</li> <li>Potentially increases costs to government and business in order to comply with self-reporting requirements</li> </ul>	<ul style="list-style-type: none"> <li>In the wrong hands, it potentially threatens security</li> <li>Challenges sovereignty</li> <li>Potentially threatens security</li> <li>Threatens mass, maneuver, and surprise in military operations</li> <li>Possibly creates friction in state-to-state relations and military operations</li> <li>Must assume corporations, small groups, or individuals with malevolent intent may be an equivalent "space power"</li> <li>Attempts to contain the threat through non-destructive or administrative means may be ineffective</li> <li>Improper use of shutter control policies could drive customers to non-US vendors</li> </ul>

<sup>73</sup> This summary is the author's compilation derived from various horaeist and preservationist works examined for and documented in this study.

Which camp has the most to gain or lose from space-derived transparency? That depends on perspective. While on the surface, horaeists might appear to be the big winners, there is the possibility that transparency can be misinterpreted or misused in a manner that undermines credibility. For example, during the 1994 massacre of Tutsis by Hutus, NGOs waged a furious public relations campaign to get the world to provide humanitarian relief to 400,000 refugees in camps in Rwanda and Zaire.

Aid flowed in to what the world saw as victims, yet it turned out that the camps receiving the aid were in fact the camps of the Hutu *génocidaires*. In the Kibeho camp housing 80,000 Hutus, NGOs balked at closing the camp and continued to care for the *génocidaires* until 22 April 1995 when a riot broke out resulting in the deaths of thousands as Hutus clashed with the Rwandan Patriotic Army – machetes, grenades, and automatic rifles ruled the day.<sup>74</sup> The deputy chief of UN Aid Mission in Rwanda (UNAMIR), Mark Frohardt stated, “. . . I do believe that it is important to understand that the inability of relief organizations to coordinate a successful operation set the stage for the tragedy that followed.”<sup>75</sup> In this case, transparency brought relief to the perpetrators of genocide setting the conditions for another, albeit smaller, killing spree. The lesson is that despite horaeists comments to the contrary, transparency and good intentions do not always yield positive outcomes.

Within the preservationist camp, armed forces, the United States military in particular, might appear to be the big loser, there is yet no concrete evidence that space-derived transparency has had a decisive negative impact on US military operations. Traditional transparency might well have played a role in the destruction of the Marine barracks in Lebanon and of Khobar Towers in Saudi Arabia. Ground observers achieved this transparency by carefully identifying force protection routines and mapping key defense weaknesses that they could exploit and overcome with well-placed powerful explosives. The lesson is that, given time and effort, even the most determined terrorist might get through a defense. To date, there is no unclassified credible evidence to suggest groups with malevolent intent might be exploiting commercial UHR imagery in a manner directly threatening to US security. This isn't to suggest it isn't possible or won't happen. The fact is it is possible and it will likely happen in the future.

---

<sup>74</sup> Peter Gourevitch, *We Wish to Inform You that Tomorrow We Will Be Killed With Our Families: Stories From Rwanda* (New York, New York: Farr, Straus, and Giroux, 1999), 188-193.

<sup>75</sup> *Ibid.*, 205.

What the limited literature suggests is that perhaps the biggest losers in a more transparent world are in fact non-democratic nations (e.g. North Korea and China) that attempt to close their societies to inspection as opposed to the United States military. Remote sensing systems make this even more likely. This will be discussed in more detail later.

## **Summary**

Traditional transparency has meant exposure of corruption (e.g. bribery, misappropriation of public resources), reporting violations of national and international laws and treaties (e.g. polluters, arms proliferators), greater awareness of human problems (e.g. famine, disease, and other forms of suffering), and condemnation of human rights violations (e.g. police state tactics). Transparency in all its forms has in some cases resulted in the imposition of fines, criminal charges, institutional reforms, and in the most extreme cases, wholesale replacement of governments. However, transparency writ large and its sub-components can be used for ill as well as good.

Space-derived transparency is an emerging trend in the 21<sup>st</sup> century. However, the level of impact it might have for non-governmental groups and what effect it will have and the primary beneficiaries are still issues to be explored. The next chapter addresses some effects, primarily the CNN effect and derives a few possible effects of space-derived transparency.

## CHAPTER 3

### POSSIBLE EFFECTS OF SPACE-DERIVED TRANSPARENCY

*Computers, fax machines, videocassettes and pervasive media coverage provided the means for ordinary citizens to share ideas in ways that totalitarian governments couldn't control. In the end communism was brought down not by military force but by the growing power of electronic communication.*

—The “CNN Effect:” TV and Foreign Policy, 7 May 1995

*Satellite imagery is only one of a whole series of information technologies that have caused states to lose control over information about what is happening within their borders.*

—Yahya Dehqabzada and Dr. Ann M. Florini, *Secrets for Sale*

In 1986, then Soviet leader Mikhail Gorbachev found his information aegis was leaking like a sieve and that his people were hearing about and embracing western ideas and commercialism. Reading the sea change, he orchestrated a policy known as *glasnost* or “openness” which allowed citizens to speak openly about the government, the communist party, and Soviet society in general. Gorbachev’s vision then was to use popular commentary to make the Soviet societal structure uncomfortable enough with its current state so that the communist party and the state would restructure and improve overall conditions within the society. This restructuring phase was known as *perestroika*. In October 1989 and again in December 1991, *perestroika* took an unexpected turn.

Unfortunately for Mikhail Gorbachev, the people realized that the communist “workers paradise” was more of a back-alley than Eden and they exercised their new freedoms in a way that destabilized not only the Soviet government, but the governments

of the Eastern Bloc. In 1989, people exercising their freedom of speech under glasnost, brought down the Berlin Wall and with its fall, doomed communist regimes throughout Europe.

One by one, dictatorships gave way to democratic government – leaders who failed to embrace democracy like the Romanian regime of Nicolae Ceausescu and East Germany's Erich Honecker, were swept out of power by popular revolts and in some cases, killed or tried for crimes against the state. Following a failed coup, the Soviet Union collapsed in December 1991. New democracies rose from its fall.

### **New Era – New Effects**

Resurgent democracy opened borders allowing for greater access to trade, economic assistance, and information. One result of democratization is greater integration into the community of nations and thus, globalization. According to Dr. Florini, three things have resulted in democratization and globalization: the **information revolution**, the growing **integration of national economies**, and the increasing **world population**. [emphasis added]<sup>76</sup>

Arguably, information exacerbated the condition of an already weakened Soviet state. The 1996 collapse of Asian currencies and the Mexican peso showed how integrated the world economy is. Fearing a global recession and the collapse of the entire world currency market, the United States took pains to intervene and bail out the Mexican economy. Finally, the United Nations estimates that in July 1999 the world's population topped 6 billion. According to the United Nations, China's population has exceeded 1.3 billion people. India, the world's largest democracy, is projected to surpass China's population in 2023. World population projections for 2050 number close to 10 billion.<sup>77</sup>

New information technologies, the availability of previously restricted or classified (space) technologies, and liberalized political policies have empowered governments, the media, and non-governmental organizations in ways unimagined between 1945 – 1994.<sup>78</sup>

---

<sup>76</sup> Ann M. Florini, *The Third Force – The Rise of Transnational Civil Society*, 3.

<sup>77</sup> U.S. Bureau of the Census, International Database. On-line, Internet, 11 February 2001, available from <http://www.census.gov/ipc/www/worldpop.html>.

<sup>78</sup> Andrew Rathmell in *The Verification Yearbook 2000*, 217.

The explosive growth of the Internet and the availability of commercial space-derived UHR imagery has allowed them to reach inside previously denied areas and effect change.

Modern transparency has created two new effects that are discussed in government, the military, and in the mass media. These are the so-called CNN Effect and more recently, the WWW Effect. Both describe the speed of information gathering and dissemination and their effects on crisis development, crisis escalation, and their consequences for fomenting a cogent foreign policy. Are these effects that could be emulated or amplified by space-derived transparency?

### **Purpose**

This chapter examines the WWW effect and in greater detail, the CNN effect. Many of the horaeist and preservationist arguments for and against space-derived transparency lie within these emerging effects. Both are new, relatively unknown, and their real impact on policy formulation isn't clear and is far from being quantified. However, their presence is real enough to have sparked congressional hearings in 1994 and has been the subject of some discussion among academics and pundits. This chapter also examines what influence space-derived transparency and analyses might have on policy formulation and actions.

### **WWW-Effect**

One new effect that has only started to emerge since 1997 is the WWW Effect. Keith Porter, a writer for *Worldnews* at About.com wrote about this phenomenon on 13 December 1999. He describes this effect as meaning that people separated by thousands of miles can be united in a common cause through the Internet and can organize themselves into an effective force in cyberspace. He notes this also means that words in a speech or analysis piece disseminated through cyberspace can have unintended consequences.

For example, he described one such situation that occurred on 22 November 1999 when Stratfor.com, a commercial intelligence analysis organization, published a report that stated that Philippine President Joseph Estrada would probably not finish his term of



office.<sup>79</sup> The Philippine media, which have a rocky relationship with President Estrada given that several pro-Estrada businesses pulled all their advertising from media outlets to protest “biased” reporting, picked this corruption item up and ran it as a lead story. President Estrada exacerbated the situation by refusing to talk to the press and when he did, accusing Stratfor.com of being in the employ of the Philippine press. The corruption story gained momentum among the people and government resulting in calls for resignation and criminal investigations. President Estrada did not finish his term and was indicted for corruption on 16 April 2001.

### **The Phenomena of the WWW-Effect**

Stratfor.com describes itself as an, “open source intelligence company, we publish our findings, day in and day out, on the World Wide Web, for all to see.”<sup>80</sup> In its analysis of the Philippine situation on 6 December 1999, Stratfor.com noted that its work has put it squarely in the midst of controversies. It identifies two phenomena at work:

- **There is the ability of organizations on the Internet to have unpredictable impact around the world** – information can diffuse quickly around the world and be used to further agendas
- **There is the strange isolation in which such incidents used to take place** – nations used to isolation from world interest are not used to having an outsider comment on internal matters when they expect to gain nothing. It is an alien concept.<sup>81</sup>

### **Spreading Phenomena**

While even Stratfor.com isn’t sure what to make of all that has happened, they note one critical point:

There is a new architecture to the global information system that will allow many ‘Stratfors’ to comment on many countries that are used to being ignored. That changes the way politics is done in many of these countries. We hope the learning curve is steep and quick.<sup>82</sup>

---

<sup>79</sup> Keith Porter, “The WWW Effect,” Worldnews@about.com. On line, Internet, 14 April 2001, available from <http://worldnews.about.com/newsissues/worldnews/library/weekly/aa121399.htm>.

<sup>80</sup> “The Heisenberg Effect, the Philippines and Stratfor.” Weekly Analysis, Global Intelligence Update. On-line, Internet, 2 May 2001, available from <http://www.stratfor.com/SERVICES/GIU/120699.asp>.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

Another example of the WWW effect is the 1997 International Campaign to Ban Landmines. It began with a fax from Bobby Mueller of the Vietnam Veterans of America Foundation (VVAF) to Thomas Gebauer of Medico International (medico) in Frankfurt, Germany on 9 April 1991 asking for cooperation on mine victim assistance projects.<sup>83</sup> By October 1992, six groups had joined together to launch the International Campaign to Ban Landmines. The groups had three goals:

- An international ban on the use, production, stockpiling, and sale, transfer, or export of antipersonnel mines.
- The establishment of an international fund, administered by the UN, to promote and finance mine victim assistance programs and land-mine awareness, clearance, and eradication programs worldwide.
- Mandatory contributions to the international fund by countries responsible for the production and dissemination of anti-personnel mines.<sup>84</sup>

The group decided on a media campaign with gripping and easily distributed materials that had to be “immediately emotive, easy to understand, and non-ideological, without the political baggage of other disarmament issues.”<sup>85</sup> Non-governmental groups around the world were encouraged to send in reports about victims of landmine explosions. These reports were recorded and sent to sympathetic government officials such as Senator Patrick J. Leahy (D-Vt) and the Prime Minister of Canada.<sup>86</sup>

The power of these actions spawned national groups to support the campaign, raising the profile of various conferences, educating large segments of national populations about the dangers of landmines in developing and war-torn nations, and stirring national publics to action. International celebrities and more than 1,000 NGOs were enlisted in the campaign. Groups began letter writing and email campaigns to government leaders around the world to call attention to the effort to ban landmines. The flood of emails, news accounts, civic action, and the visible support of Princess Diana of

---

<sup>83</sup> Motoko Mekata, “Building Partnerships Toward a Common Goal: Experiences of the International Campaign to Ban Landmines,” in *The Third Force – The Rise of Transnational Civil Society*, edited by Ann M. Florini (Washington D.C.: Carnegie Endowment for International Peace, 2000), 145.

<sup>84</sup> ICBL Press Release, 2 October 1992.

<sup>85</sup> Motoko Mekata, “Building Partnerships Toward a Common Goal: Experiences of the International Campaign to Ban Landmines,” 146.

<sup>86</sup> *Ibid.*, 173.

England resulted in 122 nations signing the treaty and the ICBL winning the 1997 Nobel Peace Prize.<sup>87</sup>

The bottom line: although the dynamics associated with these phenomena are not understood, the WWW effect appears to be real. Savvy governments, non-governmental organizations and individuals can make good use of the Internet to spread their message and effect change, even in isolated or denied areas. Its future impact may be similar to, if not greater than, the CNN effect.

### **CNN Effect**

*Today the term “CNN effect” has come to mean the impact of live broadcasting of international events on the way foreign policy is conducted.*

—The “CNN Effect:” TV and Foreign Policy, 7 May 1995

The CNN Effect or “factor” appeared in the mid-1980s with the growth of Cable News Network. It revolves around the pictures and story coverage of events, mostly humanitarian, that have the ability to draw the nation’s body politic into conflicts or humanitarian disasters. It entails the possibility that such coverage and instantaneous broadcasting of these events speeds up national decision processes in a way that might lead to poor decisions, rash actions, and a potential for escalating an incident into a crisis. A running joke in the military is that wherever CNN’s “maven of misery,” reporter Christianne Amanpour, goes the US military is sure to follow. For example, media reports of famine and the pictures of its effects on women and children in Somalia in August 1992 spurred then President George H.W. Bush to order 32,000 US troops into Somalia in December 1992.

---

<sup>87</sup> Ibid., 143.

## **Policy Implications**

Citing this example, Steven Livingston of George Washington University in a research study, *Clarifying the CNN Effect: An Examination of Media Effects According to Type of Military Intervention*, noted that the CNN Effect may act as a **policy agenda-setting agent**, an **impediment** to policy goals, or as an **accelerant** to policy decision making.<sup>88</sup> Dr. Livingston defines these effects as:

**Table 2. Conceptual Variations of CNN Effect<sup>89</sup>**

<b>Policy agenda-setting agent</b>	Emotional, compelling coverage of atrocities or humanitarian crises reorder foreign policy priorities. Somalia, Bosnia, and Haiti are said to be examples.
<b>Impediment</b>	<p>Two types:</p> <ul style="list-style-type: none"><li>▪ Emotional, grisly coverage may undermine morale. Government attempts to sanitize war (emphasis on video game war), limit access to the battlefield.</li><li>▪ Global, real-time media constitute a threat to operational security.</li></ul> <p>Somalia incident captures this effect – the bodies of dead American soldiers being dragged through the streets of Mogadishu shocked the public and arguably led to the withdrawal of American forces.</p>
<b>Accelerant</b>	Media shortens decision making response time. Television diplomacy is evident. During time of war, live, global television offer potential security-intelligence risks. But media may also be a force multiplier, method of sending signals. Evident in most foreign policy issues to receive media attention. The most recent example of this is the incident involving the collision between a Chinese F-8 fighter and a United States Navy EP-3 Aries II surveillance plane over the South China Sea and the unauthorized landing of the damaged American plane on Hainan Island in April 2001. Both the Chinese and American governments relayed public signals through the Chinese foreign ministry and the United States State Department via the media.

In the pre-CNN age, policy makers could take time to collect and analyze relevant information, debate the merits of proposed policies, consider second and third order effects, and then, ideally, implement a workable policy to address incidents and crises. Since the CNN effect ostensibly reduces the reporting cycle from days to just minutes, pressure to act can mount quickly reducing the time to collect, analyze, and debate policies thus setting conditions where new policies are implemented without considering all the effects.

<sup>88</sup> Steven Livingston, “Clarifying the CNN Effect: An Examination of Media Effects According to Type of Military Intervention,” Research Paper R-18 (Cambridge, Mass.: Harvard University, June 1997), 2.

<sup>89</sup> Ibid. This chart was derived from figure 1 in Dr. Livingston’s study.

Under these circumstances, the effect may act as an accelerant, becoming a policy agenda-setting agent truncating traditional foreign policy making processes. The resultant may be ill-conceived policies and could then become an impediment to realizing long-term policy goals. According to Dr. Livingston, “shifts in policy will produce changes in media coverage, just as media coverage may change policy.”<sup>90</sup> Writing in 1997, Dr. Livingston is careful to note that, “before we can make theoretical and empirical progress in understanding the effects of media on foreign policy we must refine the debate to meaningful terms.”<sup>91</sup> In essence, there may be a real effect at work here but we don’t know how to describe it in a meaningful way. Thus, he can only claim that we don’t know just what impact the CNN Effect has on decision making in government because it is difficult to quantify. What can be quantified is when an issue emerges in the context of a public policy debate in Congress and in the media, a policy is developed and acted upon. Whether the media directly affects the policy outcome is subject to debate.

### **Myth versus Fact**

Writing in the *American Journalism Review*, Warren Strobel, a *Washington Times* correspondent, casts doubt on the media’s ability to influence foreign policy and argues that if such an effect is real, policy makers are becoming more adept at dealing with it.<sup>92</sup> He finds that government officials are aware of the media’s power in conveying a message and thus, quoting Margaret Tutwiler, assistant secretary of state for public affairs under James A. Baker III, “it’s part and parcel of governing.”<sup>93</sup> Meaning, the government is aware of it and can control the effect. Although the CNN effect can shrink decision making time and places government and military actions under closer scrutiny, it’s “not the same as saying it determines policy.”<sup>94</sup> Thus he examines what he terms as “myths” associated with the CNN Effect:<sup>95</sup>

- **CNN makes life more difficult for foreign policy makers** – if you know how to use the fast-paced news cycle then there is no problem.

---

<sup>90</sup> Ibid., 14.

<sup>91</sup> Ibid.

<sup>92</sup> Warren Strobel, “The CNN Effect,” *American Journalism Review* (May 1996), 2.

<sup>93</sup> Ibid., 3.

<sup>94</sup> Ibid.

<sup>95</sup> Ibid., 3-9.

- **CNN dictates what's on the foreign policy agenda** – the media follows the messengers – usually the NGOs. In the case of Somalia in 1992, the media went where the NGO public affairs personnel took them. They were in Somalia and not Sudan – Somalia got the help and Sudan didn't.
- **Pictures of suffering force officials to intervene** – yes, we intervened in Somalia but once we learned the costs in terms of dollars and American soldier lives, the US government reconsidered its intervention policies. Thus we didn't intervene immediately in Rwanda in 1994, nor in Bosnia until 1995, nor in Kosovo until 1999. We don't rush in until we have a better handle on the costs.
- **There is nothing officials can do about the CNN effect** – Ted Koppel of ABC News addressed this, “to the degree . . . that US foreign policy in a given region has been clearly stated and adequate, accurate information has been provided, the influence of television coverage diminishes proportionally.” The media, like the military, fills a vacuum.
- **The CNN effect is on the rise** – there is actually a paradox at work. We are inundated with so many pictures and images of misery and suffering, that we are becoming desensitized to their effect. The United Nations Commission on Refugees is finding it more difficult to find donors to assist refugees because governments are weary of the images. Media saturation has made it difficult for even humanitarian relief organizations to raise funds.

While Mr. Strobel raises good arguments and offers some supporting evidence, as a reporter, he is a somewhat tainted messenger. As a member of the “fourth estate” he attempts to claim that the media writ large cloaks itself in objectivity – the media reports rather than make “news.” This is arguably self-serving hubris since both Dr. Livingston and Mr. Strobel acknowledge there is something to the CNN Effect. Dr. Livingston says it's real but we can't quantify it. Mr. Strobel says its more myth than real since the political and military establishment has learned to live with what he still acknowledges as a real effect. Given this, then the media is an insider to the overall foreign policy process and not simply an objective bystander. If so, do these effects influence foreign and defense policy?

### **Policy Influences?**

Former Representative Lee Hamilton (D – Ind.), once ranking member of the International Relations Committee in the US House of Representatives, underscored this point about the CNN effect on foreign policy during an 18 November 1998 lecture at Georgetown University's Insitute for the Study of Diplomacy. He stated:

The role of the media in foreign policy has become much more important since I came to congress. Television in particular has an ability to set the foreign policy agenda through the power of its images. Television drove us into Somalia and television drove us out. During the Gulf War, we learned more from CNN's correspondent in Baghdad than we learned from our own government. In fact, governments use CNN to communicate with each other.<sup>96</sup>

He noted the "fax machine, the Internet, satellites, and the like" have made the world smaller and more transparent.<sup>97</sup> In his view, this is good for democracy and human freedom; however, it makes the foreign policy process unruly and unpredictable.

One example of the CNN effect was during the 1991 Gulf War when CNN and other news organizations began airing stories about the so-called "Highway of Death," a four lane highway from Kuwait City to Basarah. Pictures of dead Iraqi soldiers, burning tanks, and a mishmash of approximately 1500 abandoned vehicles up and down the Kuwaiti highway into Iraq had, according to then Chairman of the Joint Chiefs of Staff, General Colin Powell, a galvanizing effect on the National Command Authority.

Reporters interviewed some Air Force pilots who described the devastation as "shooting fish in a barrel." Media reports made it sound "like wanton killing."<sup>98</sup> General Colin Powell quotes then President Bush as saying, "we're starting to pick up some undesirable public and political baggage with all those scenes of carnage."<sup>99</sup> Thus, fearing a public backlash as a result of the pictures, the President ordered a halt to the American advance into Iraq and ordered a cease-fire. In this case, these images acted as an impediment to completely obtaining policy goals in Iraq and as an accelerant of foreign and military policy. The ground war came to an end after only 100 hours. General Powell notes:

For good or ill, instantaneous visual communications has revolutionized news coverage in our time. Jet travel, satellites, and minicams allow live,

---

<sup>96</sup> Congressman Lee Hamilton. Ranking Member, International Relations Committee, US House of Representatives. "Changes in American Foreign Policy Over the Past 30 Years." Oscar Iden Lecture. Georgetown University Institute for the Study of Diplomacy, Washington, D.C., 18 November 1998.

<sup>97</sup> Ibid.

<sup>98</sup> H. Norman Schwarzkopf with Peter Petre, *General H. Norman Schwarzkopf The Autobiography: It Doesn't Take a Hero* (New York: Bantam Books, 1992), 542.

<sup>99</sup> Colin Powell with Joseph E. Persico, *My American Journey* (New York: Ballantine Books, 1995), 507.

around-the-clock coverage, like CNN, and have removed the old print media filters between the reporter and the audience.<sup>100</sup>

In short, the audience and the reporter now have a direct conduit to the primary source. They are there whether through television or the Internet. Now that formerly restricted space imaging technologies and products are available and in the hands of media outlets, non-governmental organizations, and individuals with the resources to purchase them, will the CNN and WWW effects be amplified by space-derived transparency?

### **Space Derived Transparency and the “Effects”**

While no detailed analysis of either “effect” adequately describes their nature or fully documents their impact, both the WWW and CNN effects are important in today’s increasingly transparent world. The government, media, and NGOs accept the principle that these effects exist. In general they agree that advanced information technologies, greater access to previously denied areas, and a process of democratization and globalization are increasing the potential effects of both on government policy making and citizen awareness and calls for action. Where the disagreement lies is in just how great the impact might be on policy making with the media arguing that such affects can be controlled if the policy makers make good policy and are schooled in how to use the media and these technologies correctly. Members of the government argue that the effects, while controllable, do play a bigger role than the media, concerned with the public’s perception of their objectivity, give them credit for. The effect of the concept may be amplified within the highly technical and communications intensive world of space-derived transparency.

Former assistant secretary of State David B. Sandalow noted in a symposium at George Washington University on 6 December 2000 that UHR imagery will have an impact on foreign policy and will have an amplified CNN Effect:

Among many impacts, I believe, will be an “enhanced CNN-effect,” with activities that once escaped widespread public notice now capable of observation by media, activists and others. Many commentators have

---

<sup>100</sup> Ibid., 514.



noted that television imagery can affect the conduct of foreign affairs. Commercially available, high-resolution imagery has the same potential.<sup>101</sup>

Space-derived transparency will likely magnify and possibly distort these effects in the future.

Mark Brender, ABC News' Pentagon producer, predicts that, "precise pictures from space will revolutionize television news by freeing reporters from relying on government-provided information during international crises and by freeing viewers from relying solely on what reporters tell them."<sup>102</sup> In other words, individual citizens will have the same access that governments traditionally have to primary source information, in this case UHR imagery, and can thus draw their own conclusions. In what is a manifestation of a preservationist nightmare, David Bohrman, an executive producer at NBC news has demonstrated how networks can use UHR imagery to create simulated flyovers of US troop encampments in Bosnia.<sup>103</sup>

This technology is similar to that used by the US military in its Eagle Vision II imagery-processing systems today to produce high fidelity imagery derived mission rehearsal simulations.<sup>104</sup> Malevolent groups could use such simulations to rehearse conventional attacks against US forces, "flight test" advanced weapon (e.g. cruise missile) attacks against targets in the United States, or enable transnational groups spread around the world to better integrate and engage in collective action.

Horaeists accept that space-derived transparency entails the risk that a transnational "bad actor" such as a terrorist organization might use commercial UHR imagery in malevolent ways. These concerns are raised by Dr. Florini in her articles about the malevolent uses of space derived information. However, Dr. Florini, like others in the horaeist camp believe there is no practical means to stem the tide of the proliferation, use, and access to space-derived information. To do so would only drive up the demand for

---

<sup>101</sup> David B. Sandalow, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, U.S. Department of State. Address, Symposium on "Viewing the Earth: The Role of Satellite Earth Observations and Global Monitoring in International Affairs," George Washington University, Washington D.C., 6 June 2000.

<sup>102</sup> Mary Graham. "High Resolution, Unresolved." *The Atlantic Online* (July 1996). On-line, Internet, 14 April 2001, available from <http://www.theatlantic.com/issues/96jul/satellite/satellite.htm>.

<sup>103</sup> Ibid.

the information, create criminal enterprises that will procure the desired information for a price, and ultimately drive business away from the US companies to nations that aren't as particular about whom they sell this space-derived information to.

### **The Emerging Role of UHR Satellite Imagery**

The availability of UHR imagery from commercial satellites is increasing. Space imaging systems potentially allow everyone to gain access to denied areas. Their products are a source of primary information for the average person. For example, media reports about satellite images showing the "ozone hole," brought greater public awareness about the dangers associated with a depleted ozone layer. As a result of the public outcry, led largely by environmental NGOs, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer was signed by 24 nations, including the United States, resulting in action to reduce CFC emissions by 35 percent by the year 2000.<sup>105</sup> In this case, space imagery brought about transparency of an issue potentially threatening to the well being of the planet.

In another example, almost immediately after the collision of a Chinese F-8 fighter and an American EP-3 Aries II Surveillance aircraft forced the damaged American plane to land on Hainan Island, CNN and other organizations procured UHR imagery of Linshui Air Base from Space Imaging Corporation of Denver. The first image, taken at 10:12 a.m. local Chinese time on 4 April 2001, clearly showed the damaged plane on the runway.<sup>106</sup> Later images revealed a line of military trucks parked next to the damaged aircraft and a tarp covering an area behind the right wing of the aircraft to the tail.

### **Space-Derived Effects**

What role this space-derived transparency might have had in influencing Chinese leaders to release the crew after 11 days is open to speculation. Did the images and the reporting act as a policy setting agent forcing the Chinese political elite to attempt to wrest

---

<sup>104</sup> The author has worked with these systems at the Space Warfare Center at Shriever AFB, Colorado from 1995-1997 and again at Nellis AFB, Nevada in 1998.

<sup>105</sup> Laurie J. Schmidt, "New Tools for Diplomacy: Remote Sensing in International Law," Earth Observatory: NASA's Distributed Active Archive Centers (12 January 2001). On-line, Internet, 10 April 2001, available from <http://earthobservatory.nasa.gov/study/diplomacy/>

control of the government response from the defense ministry to the foreign ministry? Did it act as impediment to limit Chinese actions so that they couldn't disassemble the entire plane? Did it act as an accelerant by forcing the Chinese to resolve the issue related to the crew's release earlier than they might have liked since they were threatening to legal action against the crew?

Given the complexity of China's internal government and Communist party processes, determining the impact of UHR imagery on this process is virtually impossible. However, since the Chinese government monitors world media broadcasts, they were likely aware that western news organizations and US intelligence services were watching and reporting their actions in near-real time despite their best efforts to conceal their actions and the ease of concealment under a tarp.

### **Emulation and Amplification**

What these two examples point out is that space-derived transparency is a trend in world affairs. Yahya Dehqanzada and Ann Florini of the Carnegie Endowment for International Peace believe commercial satellite imagery in the hands of news organizations, NGOs, and even nations without an indigenous space program will bring profound changes to the world. In their report, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, they conclude the following:

- Increased access to high-resolution satellite imagery will shift power from the former holders of secrets to the newly informed.
- High-resolution satellite imagery has both beneficial and malign applications.
- Attempts to control access to high-resolution satellite imagery are bound to fail.
- Commercially available high-resolution satellite imagery will trigger the development of more robust denial and deception and anti-satellite countermeasures.
- Expected gains from commercial high-resolution satellite imagery may be exaggerated.

---

<sup>106</sup> Spaceimaging.com. Accessed via Global Security.org. On-line, Internet, 22 April 2001, available from <http://www.globalsecurity.org/military/world/china/facility/lingshui.htm>.

- Good training for imagery analysts is essential. Satellite imagery can be difficult to interpret.<sup>107</sup>

Thus from the horaeist view, the proliferation of space derived imagery will likely result in:

- Greater societal openness and verification and thus a more civil society.
- An impetus to deny access to imagery that will drive a demand for other access means to include procurement from non-US sources.

Most telling of the conclusions is the assumption that any attempt to control or deny space-derived information is bound to fail. Additionally, counters to these systems such as camouflage will make detection difficult – although in some cases advanced space hyper- and ultra-spectral sensors will likely counter deception techniques. While licenses have been granted for these systems, they have yet to become commercially available.

Systematic government controls such as “shutter control” techniques and other more invasive and destructive denial efforts if employed, may breed more distrust of the US government, driving “activist” customers to other markets. The result may be that groups or nations with little ability to analyze imagery may misinterpret it thus giving it greater credence than it deserves. Any misinterpretation of the image may have some unintended consequences.

Consider, for example, what might happen if an arms control NGO orders images of a Pakistani military base and mistakenly interprets the image to show that the Pakistanis are mating nuclear weapons to Ghurari missiles. This NGO reports this to news organizations whom, using the images provided by the NGO, repeat the charges. In response, Indian nuclear forces go on alert increasing tensions between these two traditional enemies. How far this might go is open to speculation but the point is clear – space-derived imagery can tell a story, even a wrong one.

### **Misinterpreting Satellite Imagery**

Horaeists know that proper analysis and interpretation is key to ensuring that space-derived images tell the story they want told – their desire to preserve legitimacy

---

<sup>107</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, vii-viii.

compels them to be accurate in order not to harm their credibility or worse, precipitate a crisis. The lesson from Rwanda, where journalists acting as perhaps unwitting agents for relief NGOs, reported false figures of suffering in refugee camps. Once aware of the factual errors and perceiving they might have been used to spin a false story, reporters “relished the opportunity to debunk the apocalyptic warnings of humanitarian agencies.”<sup>108</sup> The damage to journalistic credibility and legitimacy wrought large taught many groups that both are fleeting things and difficult to restore once lost.

Preservationists, especially those in the military, while recognizing that some journalists are motivated by good intentions, are worried that inexperienced groups feeling empowered by this newly available technology, will tread into areas once the purview of governments, like arms control monitoring. According to John Pike of Global Security.org, “the commercial availability of high-resolution satellite imagery, promises a fundamental shift in the ability of the public to make independent assessments concerning threats from nuclear, missile and other special weapons proliferation.”<sup>109</sup> This is the same John Pike whose views on UHR imagery analysis were described as naïve by Mr. Frank Gaffney of the Center for Security Policy. As discussed in Chapter 1, the commercial venture VERTIC is using space imagery to assist its efforts to monitor and verify arms control agreements. Again, what happens when information is in the hands of non-governmental organizations that don’t have the experience to use all the available transparency tools properly?

### **Agendas and Storytelling**

For military preservationists, transparency might be of some good when exposing corruption of other nations but when exposing “mismanagement” of internal resources in ways perceived to be out of context, e.g. \$600 toilet seats for aircraft, it can threaten budgets, weapon systems, and force structure. Preservationists have a difficult relationship with the media and NGOs in general. They have little faith that these groups take the time to get the facts straight and believe that they will, if required, embellish or

---

<sup>108</sup> Michela Wrong, *Financial Times*, 25 November 1996, quoted in Nik Gowing, “‘Dispatches from Disaster Zones’: The Reporting of Humanitarian Emergencies,” paper prepared for Conference on New Challenges and Problems for Information Management in Complex Emergencies, London (27-28 May 1998), 31.

distort facts to spin a story they want told to further an agenda that runs counter to preservationist interests and perhaps, threatens their power. In short, preservationists distrust horaeist transparency accounts of military activities because they can, in the minds of many in the military, distort reality.

The most recent egregious example of transparency run amok was the 7 June 1998 CNN exposé “Valley of Death” about *Operation Tailwind* during the Vietnam War in which CNN reported that the United States military used the nerve agent GB against American defectors in Vietnam and Laos. In the wake of protests by Henry Kissinger, Colin Powell, and former CIA chief Richard Helms, CNN retained attorney Floyd Abrams to review reporter notes, collection methods, and interviews to determine if the report was fair, accurate, and supported by the evidence. His conclusion, reported on 2 July 1998, was:

Our central conclusion is that although the broadcast was prepared after exhaustive research, was rooted in considerable supportive data, and reflected the deeply held beliefs of the CNN journalists who prepared it, the central thesis of the broadcast could not be sustained at the time of the broadcast itself and cannot be sustained now. CNN’s conclusion that United States troops used nerve gas during the Vietnamese conflict on a mission in Laos designed to kill American defectors is insupportable. CNN should retract the story and apologize.<sup>110</sup>

CNN retracted the story and fired the producers. After a few months, Peter Arnett, the reporter of record who claimed he had lent his name and face to the story but had not done the research and preparation, left CNN. Citing this and other similar examples, preservationists charge that the media and other groups using questionable information and now UHR imagery can threaten the national interest by creating a CNN or WWW effect with a false or misleading presentation of facts. Thus, they argue that its necessary for a nation to protect secrets so that the freedom to act in the national interest is not compromised.

### **Examples of Faulty Imagery Analysis**

---

<sup>109</sup> Global Security.org. “Agenda.” On-line, Internet, 22 April 2001, available from <http://www.globalsecurity.org/military/world/china/facility/lingshui.htm>.

<sup>110</sup> “Report on CNN Broadcast,” CNN, (2 July 1998). On line, Internet, 14 April 2001, available from <http://www.cnn.com/US/9807/02/tailwind.findings/index.html>.

While horaeists might argue this represents an extreme example of the preservationist view of transparency dangers, it epitomizes preservationist distrust of the media in general and their fear that military actions, real or “media-contrived” will expose US forces to unnecessary risk. The image of the United States Marine on the beach in Somalia on a December 1992 night surrounded by reporters with klieg lights and cameras is the kind of transparency that military commanders, concerned with force protection and operational security, can do without.

In the case of the media and NGOs using commercial space imagery to expose treaty violations or to prove a point, preservationists cite analytical errors that while on the surface appear amusing but in reality, could, from their perspective, destabilize the security environment. For example, in 1992, when the newspaper, *European*, published images from a SPOT satellite showing what it claimed to be an Algerian nuclear research complex. Subsequent analysis by photo interpreters revealed that it was a military airbase and not a nuclear facility. Additionally, the image was published upside down and backwards.<sup>111</sup>

Another example occurred on 25 May 1998, when *Newsweek* magazine published commercial satellite imagery of what they claimed was a nuclear test site being readied in India when in fact, it was an animal holding pen.<sup>112</sup> Claiming the image was taken a week before India and Pakistan’s 1998 underground thermonuclear tests, their publication after the fact and the traditional bellicose relationship between India and Pakistan could have escalated interstate tensions and sparked an incident that might have escalated to a crisis or even conflict.

While often amusing, erroneous reporting based on faulty analysis of space-derived imagery by NGOs and the media may have destabilizing consequences. From the preservationist view, modern NGOs with access to the Internet and the media artificially produce a CNN or WWW effect that makes it more, rather than less likely that US troops will be sent into harms way as was the case in Somalia and Rwanda. Retractions of misinformation and *mea culpas* after the fact may not be enough to mitigate or halt the damage. For horaeists, this amounts to preservationist cant – as though no government

---

<sup>111</sup> Yahya A. Dehqanzada and Ann M. Florini. *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 24.

analyst ever improperly analyzed an image or used the media to tell “their story.” The fact is, horaeists acknowledge the dangers associated with misinterpretation and they know that it can affect perceptions.

For preservationists, horaeist benevolent intentions may have malevolent consequences when untrained personnel purchase and consume technologies like space-derived imagery in the same way they might order a meal in a restaurant. For this reason, among others, preservationists seek to control and even deny access, if required, to non-traditional allies and NGOs. Their national security concerns are reflected in their literature and their recommendations on how to prevent space-derived transparency from becoming a threat to the interests of the United States.

## Summary

Democratization enabled by advanced technologies has resulted in greater integration among the community of nations and thus, globalization. The interconnected state of the world has produced two effects, the WWW and CNN effects which, contrary to the belief of skeptics, has some influence on policy formulation and implementation. Two phenomena are at work:

- The ability of organizations on the Internet to have unpredictable impact around the world
- Incidents in once isolated nations are now part of the global information society

As a result, areas of the world once ignored by governments, the media, and non-governmental organizations are now transparent to the world body politic and thus, may receive greater attention. This attention may be in the form of stories on the Internet or may be covered by the mass media. Either way, depending on interest, this coverage could produce three sub-effects of the larger CNN effect which include:

- **Policy agenda-setting agent** where emotional, compelling coverage of atrocities or humanitarian crises reorder foreign policy priorities.
- **Impediment** because emotional, grisly coverage may undermine morale or where global, real-time media constitute a threat to operational security.

---

<sup>112</sup> Ibid.



- **Accelerant** since media coverage may shorten decision making response time.

As a result, there is a potential for well-publicized incidents to command disproportionate attention and result in ill-considered policies being pursued to resolve the issue before considering the consequences. The effects, while real, are not well understood and become even more complicated as governments, the media, and non-governmental organizations procure UHR imagery derived from formerly restricted technology.

Whether the phenomena and sub-effects of the WWW and CNN effects are emulated and amplified by this highly capable technology largely boils down to the quality of the imagery analysis and then, how the information is used. The media and NGOs, organizations of limited means, have demonstrated that they have been unable to consistently properly analyze imagery or cast it in a proper context.

While there has been no identifiable consequence related to the application of improperly analyzed commercially available space-derived imagery, the resultant loss of NGO and media credibility and legitimacy because of misused traditional transparency techniques fuel preservationist concerns that the imagery may have a potentially deleterious effect on security policies.

The role of synergists will be explored in Chapter 5. The next chapter briefly explores the systems and identifies who the key players are using space-derived transparency. It also examines what benefit might they derive from this evolving transparency tool.

## CHAPTER 4

# SPACE-DERIVED TRANSPARENCY PLAYERS AND SYSTEMS

*Space systems, commercial and military, are proliferating throughout the world.*

—United States Space Command, *Vision for 2020*

*To some degree, commercially produced remotely sensed data will be critical to all users of remotely sensed data. It is essential, therefore, that the integration of all user needs and vendor intentions be coordinated.*

—NASA Stennis Commercial Remote Sensing Program

In a 1999 essay entitled “National Space Policy and National Defense,” Mark J. Berkowitz, Director of Space Policy in the office of the Assistant Secretary of Defense for Command, Control, Communications, Intelligence, Surveillance, and Reconnaissance (C3ISR), noted that since the end of the Cold War, seven spacefaring nations and international organizations have launched satellites. He further states:

About 1,500 to 1,800 satellites may be launched into orbit in the next 10 years. Seventy percent of these launches may be of commercial spacecraft and US flag carriers are likely to launch 30 percent. Commercial satellite demand is expected to fuel industry growth at an annual rate of 20 percent. This could mean as many as 70,000 new high technology jobs and over \$100 billion in worldwide revenues each year.<sup>113</sup>

To the space optimist, this growth might be considered a boon on par with industrialization or the computer age. Even General Moorman called his 1998 article in

---

<sup>113</sup> Mark J. Berkowitz, “National Space Policy and National Defense,” *Spacepower for a New Millennium: Space and U.S. National Security*. Edited by Lt Col Peter L. Hays et al. United States Air Force Institute for National Security Studies (New York: The McGraw Hill Companies Inc, 2000), 49.

the *Air Power Journal*, “The Explosion of Commercial Space.” However, as pointed out in chapter 2, this is an optimistic assessment of the growth of commercial space.

Far from being a “big bang,” there is no doubt that the market for commercial space imagery products will grow – as with all capitalistic ventures, how much and how fast depends largely on whether or not the systems and vendors provide a product consumers want. Like other industries, it also depends on licensing and regulation, vendors to market and provide the product, and users to purchase the goods and services.

### **Purpose**

This chapter identifies the player groups in commercial space-derived transparency – the regulators, vendors, and users. Preservationists can be found in each of these groups while the horaeists are confined largely to the user category. However, the horaeist cause may be championed within the regulator realm. This chapter will also briefly examine the types of commercial imaging systems that are being regulated and employed by vendors, and how they might be used.

### **The Players**

Dynamic interaction related to the nature of a “thing” can be usefully illustrated as the complex interaction between dominant dimensions. The military favors trinities to describe and explain these interactions. For example, the nature of technology influences the interaction between strategy, doctrine, and policy. Even Clausewitz recognized this trinitarian tendency in his treatise *On War* where he relates the nature of war to the interaction between the government, the military, and the people.<sup>114</sup> This construct works well within the environment of space-derived transparency in that there is an interaction between three groups – regulators, vendors, and users.

---

<sup>114</sup> Michael I. Howard, *Masters of War: Classical Strategic Thought* (Portland, Ore.: Frank Cass Publishers, 2001), 110.

## **Regulators**

Space-based UHR systems are subject to regulation for licensing, operation, and distribution of products. For purposes of this study, a regulator is an entity with the authority and responsibility to act as a control agency in order to establish and ensure compliance with treaties, laws, regulations, and rules. In the case of space imaging systems and related entities that could provide space-derived transparency, regulators are governments acting through their sanctioned agents and supranational groups, specifically the United Nations acting through the Committee on the Peaceful Uses of Outer Space (COPUOS).

**Governments.** Organized to act as an agency to govern, a government's legitimate authority to act is normally provided for by founding documents such as a constitution that describes its system of fundamental laws and principles that in turn prescribes the nature, functions, and limits of the government and its institutions. In democracies, legitimacy is normally derived from the "consent of the governed" with provisions that consent is granted through periodic open elections. Other types of government such as dictatorships may govern without the direct consent of the body politic – their legitimacy is normally affirmed largely through recognition of other state governments. Popular support within dictatorships can be generated through leadership inspired nationalism and perhaps even fear of internal state organs like the secret police.

Within a liberal construct, governments are responsible for establishing laws, policies, and rules that set the "rules of the game." These laws, policies, and rules bound the path within which commercial entities operate. The natural tension is between government who imposes rules that regulate and restrict freedom of action and the vendors who desire as little regulatory restraint and constraint of their actions. In considering the impact of commercial space on the military sector, a tension exists between "military effectiveness and economic efficiency."<sup>115</sup> So how might governments relieve tension and strike a balance satisfactory for horaeists and preservationists?

---

<sup>115</sup> Lt Col Peter L. Hays, et al, "Spacepower for a New Millennium," *Spacepower for a New Millennium: Space and U.S. National Security*, 11.

According to knowledgeable preservationists, the government must consider the dynamic interaction and relationship between civil, military, and intelligence space sectors before embarking on a completely open course of space-derived transparency.<sup>116</sup> Preservationists fear that space-derived transparency may prove to be a “two-edged sword that greatly favors the offense and preemption using long-range precision strike forces.”<sup>117</sup> The question then becomes how to incorporate commercial space imagery products in military operations while still fostering a permissive environment for non-military users to exploit formerly restricted space technology without compromising national security policy and operations.

In consideration of horaeist demands for greater access to UHR imagery, Congress enacted the 1992 Land Remote Sensing Policy Act. Prior to the passage of the 1992 act, space-derived transparency allowed only well resourced nations to have the luxury of seeing deep inside the sovereign territory of other states. The act set the boundaries for commercialization and the declassification and proliferation of UHR technologies and imagery.<sup>118</sup> While encouraging the sale of UHR data and services and providing “for the sale of turnkey systems and sensitive components subject to significant export controls,” the 1994 Presidential Decision Directive 23 (PDD-23), set conditions that could narrow the road created by the 1992 legislation.<sup>119</sup>

Additionally, Title 15, Subchapter II (Licensing of Private Remote Sensing Space Systems), Section 5621 (General Licensing Authority) grants licensing authority to the Secretary of Commerce who may “license private sector parties to operate private remote sensing space systems.”<sup>120</sup> While the 1992 Act, Title 15, and PDD-23 asserts a measure of control over the process of US space commercialization, they cannot anticipate nor resolve all the complex security issues associated with the proliferation and use of advanced UHR technologies and imagery.

---

<sup>116</sup> Ibid.

<sup>117</sup> Ibid.

<sup>118</sup> United States Code Title 15, Chapter 82, Land Remote Sensing Policy, derived from Section 1 of Public Law 102-555 cited as the Land Remote Sensing Policy Act.: On-line, Internet, 14 December 2000, available from <http://www.geo.arc.nasa.gov/sge/landsat/15USCch82.html>.

<sup>119</sup> Lt Col Peter L. Hays, et al, "Spacepower for a New Millennium," 13.

<sup>120</sup> United States Code Title 15, Chapter 82, Land Remote Sensing Policy, derived from Section 1 of Public Law 102-555 cited as the Land Remote Sensing Policy Act.: On-line, Internet, 14 December 2000, available from <http://www.geo.arc.nasa.gov/sge/landsat/15USCch82.html>.

While preservationists see a value in regulating UHR technology and products through licensing and the imposition of controls (e.g. “shutter control” where the imager is turned off over certain areas or for a period of time), they question whether policy makers are more interested in ensuring that US licensed space companies dominate the imaging market rather than concerning themselves with the possible national security implications. Horaeists argue that after years of preventing general access to the technology and products, there are still too many restrictions.

They claim, “the instinct of governments confronted by new technologies is generally to bring them under control (or at least try to) when those technologies are related to matters of power and politics.”<sup>121</sup> Horaeists note that the exorbitant costs associated with building, launching, operating, and sustaining a profitable commercial space imagery business has led companies to attract capital investment and establish partnerships with worldwide investors of various nationalities. This complicates the ability of any one regulating nation to impose operational restrictions. This regulatory disparity creates tensions between nations operating imaging systems because of perceived support for groups opposed to a nation’s interests and presumably tilts the market in favor of the less restrictive nation. Such disparities and the resulting tensions may make any policy of shutter control ineffective.<sup>122</sup>

Again, there is a natural tension between domestic investors that might support preservationist efforts to preserve national security and international investors that seek only to maximize profit.<sup>123</sup> The bottom line: national governments can license and impose a degree of restriction on the operational use, proliferation, and dissemination of UHR technology and images however, its control is limited by complex financing and partnership arrangements and the desire to maintain preeminence in the field, among other things. As members of the international community, governments also must respect the admonition of transnational bodies.

---

<sup>121</sup> Robert P. Merges and Glenn H. Reynolds, “The News media Satellites and the First Amendment: A Case Study in the Treatment of New Technologies,” *High Technology Law Journal*, Vol 3 (Spring 1988), 31.

<sup>122</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 22.

<sup>123</sup> *Ibid.*

**Transnational Governance.** Much like a sovereign national government, the United Nations plays a role in regulating space writ large. While the Westphalian principle of respect for national sovereignty as codified within the UN charter applies, the UN provides a voice for those nations that lack an indigenous space-based remote sensing capability in order to secure for them some benefit that UHR imaging and analysis systems may provide. Additionally, as the repository for the five major space treaties:

- Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies (1967) – Key provision is that nations agree not to permanently station weapons of mass destruction in space.<sup>124</sup>
- Agreement On The Rescue Of Astronauts, The Return Of Astronauts And The Return Of Objects Launched Into Outer Space (1968) – nations agree to assist astronauts in distress and recognizes that space systems are owned by the nation developing, launching, and operating them.<sup>125</sup>
- Convention On International Liability For Damage Caused By Space Objects (1972) – nation is liable and required to settle all claims for damage if their respective space system causes damage.<sup>126</sup>
- Convention on Registration of Objects Launched into Outer Space (1975) – nations agree to register objects launched into space with the United Nations.<sup>127</sup>
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) – like Antarctica, the moon and other celestial bodies are for all people, therefore, no nation can lay claim to them.<sup>128</sup> Most spacefaring nations, including the United States, have not signed this treaty.

With more than 70 space-based observation, monitoring, and remote sensing agreements, the UN is playing an increasingly important role in leveling the playing field for current space powers and those aspiring to contract space capabilities through

---

<sup>124</sup> Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies (1967): On-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH500.html>

<sup>125</sup> Agreement On The Rescue Of Astronauts, The Return Of Astronauts And The Return Of Objects Launched Into Outer Space (1968): On-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH523.html>

<sup>126</sup> Convention On International Liability For Damage Caused By Space Objects (1972): On-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH595.html>

<sup>127</sup> Convention on Registration of Objects Launched into Outer Space (1975): On-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH653.html>

<sup>128</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979): On-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH766.html>

commercial ventures.<sup>129</sup> The General Assembly's Committee on the Peaceful Uses of Outer Space, through its legal subcommittee, adopted *Principles Relating to Remote Sensing of the Earth from Outer Space*. Produced in 1986, these 15 principles define remote sensing and its components and posit and explain the relationship between spacefaring nations with remote sensing capabilities and those non-space capable nations that might be imaged. Interestingly, the principles appear to lay a foundation for synergy between the horaeist and preservationist camps.

Key to the apparent synergism within the principles is how the UN envisions remote sensing will be used for the “purpose of improving natural resources management, land use and the protection of the environment.” Given the lack of clarity about the possible use of remote sensing for intelligence gathering and verification, the principles are less expansive than horaeists would like, particularly those groups dedicated to arms control issues (VERITEC, GlobalSecurity.org, etc.). Preservationists on the other hand can find some comfort in what is specified although they must recognize that there are no limitations placed on the quality and nature of the technology – thus an astute user can derive other benefits to include targeting information. Other key provisions within the principles that demonstrate potential synergies include:

Remote sensing is for the benefit of all nations regardless of “economic, social or scientific and technological development.” Meaning those that can should assist those who cannot.<sup>130</sup> There are now a number of cooperative ventures between spacefaring and non-spacefaring nations. For example, on 9 March 1993, the US and Mongolia signed a Memorandum of Understanding on Cooperation in the Collection of the 1 Kilometer Advanced Very High Resolution Radiometer Image Data.<sup>131</sup>

- These activities will not be “conducted in a manner that is detrimental to the sensed state.” In other words, the Eisenhower principles related to “open skies,” without an Orwellian intrusiveness that violates privacy and threatens individual liberties, is desired.<sup>132</sup>

---

<sup>129</sup> Report of the Committee on the Peaceful Uses of Outer Space, *List of International Agreements and Other Available International Documents Relevant to Space-Related Activities* (Vienna, Austria: United Nations, 2001), 20-24.

<sup>130</sup> UN General Assembly Committee on the Peaceful Uses of Outer Space (COPUOS), “Principles Relating to Remote Sensing of the Earth from Outer Space,” 1986. Derived from Principles I – III.

<sup>131</sup> Report of the Committee on the Peaceful Uses of Outer Space, *List of International Agreements and Other Available International Documents Relevant to Space-Related Activities*, 22.

<sup>132</sup> Ibid. Derived from Principle IV.



- Those states that have an indigenous remote sensing capability should seek to include those nations that cannot perform such feats in joint ventures. This also includes providing technical assistance.<sup>133</sup>
- Any state that owns or licenses space-based imaging systems should provide any analyzed and annotated imagery to nations lacking this capability whenever it might be useful in averting “any phenomenon harmful to the Earth’s natural environment.” This information should be transmitted to affected states as soon as possible. This could include information that would assist governments in mitigating the effects of a natural disaster or even assist urban planners in developing areas that are not subject to flooding or other natural disasters, etc.<sup>134</sup>
- States capable of remote sensing operations “shall, upon request, enter into consultations with a State whose territory is sensed” in order to allow them to participate in operations or purchase imagery of anything within their territory at fair market prices.<sup>135</sup>
- States capable of conducting remote sensing from space must respect the various space treaties and international law “irrespective of whether such activities are carried out by governmental or non-governmental entities or through international organizations to which such States are parties.” In other words, the actions of governments, NGOs, etc. must be consistent with the spirit and intent of applicable treaties and law.<sup>136</sup> The problem becomes determining how treaties and laws that are designed for states apply to non-state entities.

Seeking to honor these principles, the United States, through the 1992 Land Remote Sensing Policy Act, requires private companies to make unenhanced data “available to the governments” of sensed states.<sup>137</sup> The bottom line: national and transnational government organs play a significant role in establishing the boundaries of the commercial environment for the collection, analysis, proliferation and dissemination of formerly restricted space UHR technology and products. They also may influence how the products are disseminated and to a lesser extent, how they are used.

## **Vendors**

Vendors are those entities who proffer and sell goods and services – in this case, entities who construct, operate, sustain, task space imaging systems to take the terrestrial

---

<sup>133</sup> Ibid. Derived from Principles V – VI.

<sup>134</sup> Ibid. Derived from Principles X – XI.

<sup>135</sup> Ibid. Derived from Principles XII – XIII.

<sup>136</sup> Ibid. Derived from Principles XIV.

<sup>137</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 16.

image, and then either directly or through private firms, sell the space-derived imagery product to users in exchange for currency, goods, or services. For purposes of this study, such vendors may include governments and various commercial space imaging entities such as Space Imaging corporation of Thornton, Colorado. Vendors may be domestically or internationally financed and controlled. Domestic vendors are generally subject to laws, policies, and rules established by the national government. International vendors are subject to national laws, policies, and rules insofar as they are applied and enforced by government authorities within their respective borders or operational areas. The finer points of international commerce law are beyond the scope of this paper. However, in the case of multi-national or foreign vendors selling imagery products within another nation's borders, the key issues become which laws are applied, when they are applied, and how.

**Governments.** As previously discussed, governments establish the ground rules and operational boundaries for commercial vendors within their territories. In some cases governments become the providers of formerly restricted space technologies and, as in the case of the United States, Russia, India, Canada, and France, may serve as providers for various types of UHR images through private vendors.

For example, the governments of Russia, France, and India build, own, and operate the space imaging system and support infrastructure but rely on private vendors to market the imagery.<sup>138</sup> The Russian and Indian government maintain control of the data in order to limit distribution of data deemed sensitive to their respective national and industrial security. For example, Russia's Sovinformsputnik markets its SPIN-2 high resolution panchromatic satellite images through Aerial Images, Inc (<http://www.aerial-image.com>) of Raleigh, North Carolina and Central Trading Systems, Inc. of Huntington Bay, New York.<sup>139</sup> India contracts with Space Imaging Corporation to market its imagery.<sup>140</sup> Canada has turned control of their respective civil imaging satellites to private ventures.

---

<sup>138</sup> Ibid., 17.

<sup>139</sup> Sovinformsputnik. On-line, Internet, 17 May 2001, available from <http://www-com.iasis.svetcorp.net/serv.html>

<sup>140</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 17.

Commercial Entities. Since 1992, a number of commercial vendors have emerged to develop and orbit space imaging systems as well as market the space-derived imagery products. As mentioned before, Aerial Images, Inc. and Central Trading Systems, Inc. are examples of product vendors. Earthwatch (US), Space Imaging Corporation (US), ORBIMAGE (US), and ImageSat, formerly West Indian Space, Ltd (US-Israel), are examples of commercial entities that develop, orbit, and serve as product vendors. Costs associated with processed imagery are largely based on resolution and area coverage – the range is between \$1,000 - \$4,000 for a single image.<sup>141</sup> Costs are also influenced by the timeliness of the data required. For example, due to the limited number of imaging systems available, a user request may take up to four weeks to fulfill. However, if the satellite is positioned relatively close to the desired image location and the imager is available, then the finished product could be delivered within 48 hours of the image request.<sup>142</sup> Thus, cost can be affected by premiums that may be based on or attached to the timeliness of the product.

Space Imaging Corporation, operators of the IKONOS-2 satellite charges for a minimum order of \$1,000, \$12 - \$17 per square kilometer for images of North America. This increases to a minimum order of \$2,000 and \$29 - \$44 per square kilometer for imaged areas outside of North America.<sup>143</sup> This increased cost takes into account the terrestrial infrastructure required to store and downlink imagery data to ground stations outside the United States. Vendors can take imagery orders from users telephonically or via the Internet – a credit card is typically all that is required.

## **Users**

Users are those who avail themselves of space-derived imagery from commercial and government vendors. These include governments, military, and transnational groups such as non-governmental organizations and malevolent groups (e.g. terrorist cells). This study limits its discussion to these for purposes of time and because these entities tend to encompass the operations of concern for both horaeists and preservationists. However,

---

<sup>141</sup> Ibid., 19.

<sup>142</sup> Ibid.

<sup>143</sup> Jonathan Lipman, "Views You Can Use . . . or Abuse?" Space.com (5 January 2000).:

the author recognizes that individuals, realtors, laboratories, etc. with the appropriate resources, can and do avail themselves of commercial space UHR imagery.

**US Government.** The United States has availed itself of commercial imagery to supplement imagery provided by national technical means. Aside from using both US Landsat and SPOT satellite imagery to supplement national technical means during the Gulf War, in 1995, the US provided the International Criminal Tribunal for the Former Yugoslavia at the Hague with highly processed imagery that blended images from the US Landsat multispectral imaging satellite with images from the French SPOT satellite.<sup>144</sup> Using specialized change-detection processing software, the images showed denied areas where mass graves might be located.<sup>145</sup> Additionally, the US Ambassador to the United Nations, Madeline Albright, presented the UN Security Council with similar images of people in a soccer stadium in Bosnia, and images taken a few days later showing fresh mounds of disturbed earth nearby.<sup>146</sup> Once granted access to these previously denied areas, ground teams investigated these locations and were able to confirm what the images showed, that various armed groups had indeed engaged in wholesale killing and attempted to conceal their work in mass graves.

**Foreign Governments.** Given the proliferation of commercial imaging systems and vendors, governments without an indigenous space capability are contracting with vendors to meet their space needs. In some cases they are participating in partnerships with space-capable governments to resolve pressing domestic problems. For example, NASA is working with the government of Belize to use Landsat, SPOT, and Canadian Radarsat data to “predict malaria vector presence” in order to better control mosquito populations and thereby mitigate malaria outbreaks.<sup>147</sup> Other uses include monitoring drought conditions in African nations, predicting crop yields in various countries, examining the deforestation rate of the Brazilian rain forest, and no doubt, monitoring

---

<sup>144</sup> David B. Sandalow, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, U.S. Department of State. Address. Symposium on “Viewing the Earth: The Role of Satellite Earth Observations and Global Monitoring in International Affairs,” George Washington University, Washington D.C., 6 June 2000.

<sup>145</sup> The author observed this process during 1995.

<sup>146</sup> David B. Sandalow, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, U.S. Department of State. Address. 6 June 2000.

<sup>147</sup> Ibid.

other nations military activities. As in the United States, urban planners, cartographers, industrial concerns, and even intelligence organs may make use of UHR imagery

Military. As mentioned in Chapter 1, the United States National Imagery and Mapping Agency (NIMA) has contracted with various vendors to provide UHR imagery to supplement its operations and database. NIMA's Fiscal Year 2000 -2005 budget for commercial imagery from Space Imaging Corp. is \$2.7 billion.<sup>148</sup> The Report of the Independent Commission on the National Imagery and Mapping Agency calls for NIMA to purchase \$350 million per year in commercial imagery products.<sup>149</sup>

Additionally, United States Space Command's *Vision for 2020* includes a discussion about Global Partnerships (GP) – an operational concept designed to “strengthen military space capabilities by leveraging civil, commercial, non-US intelligence, national, and international space systems.”<sup>150</sup> This concept assumes three enduring trends:

- Military warfighting requirements that exceed constrained military budgets in the out-years
- Dramatic growth in space-based capabilities among the civil, commercial, intelligence, and national communities
- Growth in multi-national operations and alliances<sup>151</sup>

Commercial imagery can be used to fill in the “information holes” left by national technical means. It can also be used to provide unclassified space-derived imagery products and therefore, space-derived transparency, to US allies and non-allied coalition partners. In short, commercial UHR imagery will serve as an important commodity for the United States military and for other militaries around the world. The consequences of this US-sponsored space-derived transparency in preparing operations, as Lt Col McKinley notes, will be that we have to assume that both friend and foe will “have our

---

<sup>148</sup> National Imagery and Mapping Agency Budget. GIC Budget for Contract Production. Omnibus Contractor Status (as of 13 April 2001). On line, Internet, 21 April 2001, available from <http://164.214.2.59/ogic/budget.html>.

<sup>149</sup> Ibid.

<sup>150</sup> *United States Space Command: Vision for 2020*, (Colorado Springs, Colo.: United States Space Command, 1997), 13.

<sup>151</sup> Ibid.

eyes.”<sup>152</sup> If they procure it on their own, we may not know what they have. If we provide it for them, then we exercise some control over what they see and to a lesser extent, how they might use it.

**Transnational groups.** For purposes of this study, transnationals are those groups or organizations that reach beyond or transcend national boundaries or may involve themselves in the activities of several nations or nationalities. These include benevolent and malevolent non-governmental organizations. For the purposes of this study however, NGOs are those groups organized around a charter that espouses and is generally recognized as having benevolent intent. Terror organizations, or groups like Neo-nazis and similar organizations, whose charter espouses violence and hatred, are deemed malevolent forces. Transnational groups may include internationally recognized organizations such as the United Nations, the World Trade Organization, etc.

All of these groups are part of what Dr. Florini and other horaeists describe as “transnational civil society.” Transnational civil society has an increasing role in the concept of global governance.<sup>153</sup> Though typically organized around or focused on a core concern, these groups often attempt to act as a bridge between the national and global interests. Through influence and actions, they seek to persuade the government and the private sector to change their position or in the event persuasion fails, to threaten to go public with actions and information that might prove embarrassing or undermine the government and private sector’s position.<sup>154</sup> As governments are largely bureaucratic and tend to interact with other nations’ bureaucratic entities they are often slow and deliberative in their approach to interstate relations, are concerned with protecting national interests, and in tend to focus efforts on national and international problems affecting vital and important interests.

**Non-governmental Organizations.** Governments are typically suited to formulate deliberate public policy and enact and enforce laws. The inability to act quickly and the limited scope of action within those attributed, as in the case of the United States, to vital, important, and humanitarian interests, allows niche NGOs to

---

<sup>152</sup> Lt Col Cynthia A.S. McKinley. "When the Enemy Has Our Eyes," *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*, 346.

<sup>153</sup> Ann M. Florini, *The Third Force – The Rise of Transnational Civil Society*, 3.

<sup>154</sup> *Ibid.*, 11.

operate. They function in areas where governments are unable or unwilling to act. Whereas government legitimacy may be affirmed by periodic elections, NGOs are generally only accountable to their members.

Given advanced information technology, access to formerly restricted and classified technologies, and increasing democratization and globalization, factors that shape established and credible NGOs include that they:

- Are usually suited to work where there are no official government to government relations and in other environments where it would be too complicated for any government to operate.
- Tend to be small and non-bureaucratic, and can be more responsive to changing circumstances on the ground thus giving them a comparative advantage over government in providing assistance during times of rapid political change or crisis.
- Are typically independent from governments, which allows them to work with many other groups abroad who would hesitate to take funds from government.
- Have well-established networks and are usually better able to work with other NGOs, transnational actors, and factional movements both inside and outside of government.
- Can provide targeted resources and training to empower nascent political, typically democratic, movements to develop so that at some point they achieve a status in which governments will recognize and work with them.

Because of perceived government inability or intransigence and in some cases, policy disagreements, NGOs are proliferating. According to the Union of International Associations, there are more than 17,000 NGOs operating in the world. This is an increase of more than two thousand since the year 2000.<sup>155</sup> In some cases such as hunger relief, NGOs are better organized, trained, and experienced than most governments to meet the most pressing human needs. While disaster and humanitarian relief has in the past been the *raison d'être* of many NGOs, in an increasing democratic and globalized world, they are evolving to be much more.

Many are now organized around arms control, environmental concerns, democracy movements, economic issues, anti-corruption, human rights, and a myriad of

---

<sup>155</sup> Yearbook of International Organizations (by type) 1999/2000 edition published online by the Union of international Associations: on-line, Internet, 31 March 2001, available from <http://www.uia.org/>

other causes. Generally receptive to new methods of action and technology, NGOs are taking advantage of commercial UHR imagery to assist them with their work.

For example, Reliefsat (<http://www.nrsc.no/reliefsat>), is experimenting with UHR imagery to assist relief organizations in developing products and procedures for, “more efficient and cost-effective planning and management of refugee situations.”<sup>156</sup> The vision is to allow relief NGOs to, “integrate information available from very high-resolution earth observation satellite data directly into the decision-making and operational processes.”<sup>157</sup> Some of the products include: “high-quality space maps of refugee camps, roads, surrounding water resources, forests etc. in digital and hardcopy format.”<sup>158</sup> As of this writing, Reliefsat has produced some space-derived imagery mapping products for three refugee case studies: Qala en Nahal in Sudan, Chiapas in Mexico, and Site 2 in Thailand. Reliefsat claims that “very high-resolution satellite images can be a cost-efficient method for rapidly and at relatively minor risks obtain and share information during refugee relief operations.”<sup>159</sup> The overall aim of the program is to increase the number of human lives saved. Thus, benevolent NGOs are attempting to derive new synergies from space-derived transparency. They are not alone in this regard.

**Malevolent Forces.** The darker side of transnational civil society is composed of loose associations of individuals and groups who operate outside the norms of international law and treaty. Their activities tend to be destructive and in some cases, calculated to intimidate governments, industry, and society through actions that steal sensitive information that can be used to gain an unfair advantage or to inculcate fear. Like their benevolent counterparts, they tend to pursue political, ideological, financial, or religious aims. These groups include but are not limited to industrial spys, terrorists, and drug traffickers. Whatever the United States and humanitarian organizations like Reliefsat can do to tailor UHR imagery to meet their respective needs, malevolent users can, with the right resources, do as well.

These dark forces can use space-derived information to identify critical government targets, map force deployments, discern security and force protection

---

<sup>156</sup> Reliefsat. On-line, Internet, 31 March 2001, available from <http://www.nrsc.no/reliefsat/>

<sup>157</sup> Ibid.

<sup>158</sup> Ibid.

<sup>159</sup> Ibid.



arrangements, locate personnel billeting areas, and precisely locate key military and political targets. With precise and timely information, these groups can monitor activities and can employ various weapons to frustrate military operations or to maximize effects.

Less malevolent but no less illegal, these forces may be able to steal industrial and government intellectual and property secrets. In less developed nations, organizations with better knowledge than the government may be able to unfairly negotiate drilling and mineral rights or even deprive governments and individuals of legal royalties.<sup>160</sup> Given the increasing availability of formerly restricted space imaging technologies, even under-resourced governments, militaries, NGOs, and malevolent forces potentially can derive benefits from an increasing variety of highly capable UHR imaging systems.

Both horaeists and preservationists are aware of these potential problems. The preservationist response is for better controls over tracking the user requests for UHR imagery and if necessary, denying access to the information. Horaeists however, still maintain that on balance, “the element of strategic transparency provided by readily available commercial images does far more for maintaining peace than it does for sharpening means of attack.”<sup>161</sup> Given the increasing availability of highly precise UHR imagery and imaging systems and the proliferation of NGOs and malevolent forces, preservationists view such sentiments as pollyanic.

## **Space-Derived Transparency Systems**

The technical means of space-derived transparency are complex and expensive however, given the steady commercialization of formerly restricted UHR technology, they are feasible. For almost 40 years, the US and Russia, and more recently, Canada, France, India, Japan, Israel, and China have operated space-based collection means to survey the Earth’s surface. Commercialization has allowed virtually anyone with the wherewithal and the means to procure space-derived imagery products of a quality on par with most spacefaring nations.

---

<sup>160</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 24.

<sup>161</sup> Lt Col Larry K Grundhauser, “Sentinals Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security,” 68.

Although currently deployed in relatively small numbers US national technical means licensed and operated space-based sensors collect the following information:

- Foreign Instrument Signals Intelligence (FISINT) used in weapons testing
- Signals Intelligence (SIGINT)
- Communications Intelligence (COMINT)
- Electronic Intelligence (ELINT)
- Measurement and Signals Intelligence (MASINT) for defense related information for indications and warning (I&W)

These have formed the basis for US intelligence efforts that underpin public, foreign, and military policies and operations. So it was once in Russia and may be in other spacefaring states. Among the traditional space systems employed by the United States and some other nations like Russia are missile warning, reconnaissance (remote sensing), navigation, communication, and other specialized satellite systems. Unlike the United States and other traditional spacefaring nations, commercial space ventures concern themselves with those systems that potentially produce the greatest return on their investment – communications and remote sensing.

National SIGINT space-systems are managed within a sophisticated integrated architecture called Integrated Overhead SIGINT Architecture (IOSA).<sup>162</sup> The National Imagery and Mapping Agency is working to develop a similar architecture, the Future Imagery Architecture (FIA), to support the task, process, exploit, and dissemination of national and presumably, US government purchased commercial imagery. The point is that the US has years of operational experience in managing sophisticated spacepower systems and providing space-derived information; experience that can be used to implement a robust architecture for a more comprehensive spacepower capability to include increasingly available commercial UHR imagery from domestic and foreign sources. In a similar fashion, commercial UHR imagery ventures have a much smaller infrastructure optimized to allow them to task their satellite systems, process the data collected, and to a lesser extent, exploit and disseminate their finished imagery products.

The quality of these commercial space products is approaching those of the intelligence systems employed by the established spacefaring nations. For example, EarthWatch Inc. has been granted permission by NOAA to fly its QuickBird 2 satellite,

due to launch in October 2001, in a lower orbit providing a 2 foot or 61 centimeter resolution – it will be the “sharpest commercial eye in the sky.”<sup>163</sup> Both EarthWatch Inc. and Space Imaging Corporation have also received licenses for satellites with a 1.6 foot or 50 centimeter resolution.<sup>164</sup> Both of these satellites will be operational by 2004.

Current national, civil, and commercial systems provide coverage of most of the Earth’s surface but not on a continuous basis. Revisit rates over the same location on the earth vary between 4 – 16 days. For example, the LANDSAT multi-spectral imaging system operated by NASA takes 16 days to revisit the same spot on Earth (see Table 4-1). This is because there are only two of them in low orbit. Based on its orbital elements, positioning data, this is the best these systems can do without altering orbit or using mirrors that allow the system to maintain its current orbit and image a scene off-nadir (direction toward the center of the earth – directly below the central point of the satellite).

However, as more commercial systems become available, it is conceivable that any user, for example the US government, could in the absence of a national satellite coverage, purchase an image from either EarthWatch Inc. or Space Imaging to meet its immediate need. This is certainly cheaper than the US government constructing a large number of these imaging systems in the same or slightly higher orbit that might provide continuous coverage of the Earth with a near-instantaneous revisit rate. However, there are various types of imaging sensors that have certain capabilities and limitations.

**Panchromatic imagery – Electro-optical and film drop.** These systems got their start in 1960 with the film dropping Discoverer satellites. They may be digital imagers that scan the surface, store and then download digital images to a receiver station. The EarthWatch Inc. QuickBird 2 and Space Imaging Corporation’s IKONOS-II satellite are examples of this type of system. Another type is the Russian SPIN-2 photoreconnaissance satellite that employs a high-resolution camera capturing images on high quality film. Once the roll of film is used up, it is dropped from the satellite to earth where the film is retrieved and processed. These imagers provide the most clear and

---

<sup>162</sup> Report of the Independent Commission on the National Imagery and Mapping Agency, *The Information Edge: Imagery Intelligence and Geospatial Information in an Evolving National Security Environment*. Washington, D.C.: Government Printing Office, 2000.

<sup>163</sup> Jason Bates, “EarthWatch to Sharpen its Images,” *Spacenews.com* (22 March 2001).

<sup>164</sup> Jason Bates, “U.S. Approves Licenses for Two Imaging Satellites with Half-meter Resolution,” *Spacenews.com* (18 December 2000).

precise photo quality images of the surface – they are by far the easiest to analyze and interpret.

This ease of analysis is important, as most non-traditional users of UHR imagery don't have trained analysts to interpret images for them. As was noted in chapter 3, this poses potential problems with an enhanced CNN effect – any misinterpretation of an image may amplify the CNN effect even more. A key limitation associated with electro-optical and panchromatic systems is that they can only image areas where there is little cloud cover and there is enough visible light reflecting from the surface to discern features.

**Spectral sensors.** These systems are designed to read the distribution of energy emitted by a radiant source at one or more wavelength intervals. They are ideally suited for the infrared, or non-visible bands of light. The three sensors available today are the infrared, multi-spectral, and hyper-spectral sensors although ultra-spectral imagers are in development.

- **Infrared** – data collected within the range of invisible radiation wavelengths from about 750 nanometers, just longer than red in the visible spectrum, to 1 millimeter, on the border of the microwave region. Can be used to image locations in darkness or when certain types of cover or camouflage are in use.
- **Multi-spectral** – data collected from **two or more** spectral regions or bands – the same scene is imaged in several spectral bands at the same time by the same sensor. Allows for spectral identification of major surface features such as trees, grass, water depth, soil moisture content, and roads.<sup>165</sup> Examples include: Landsat (US) and SPOT (France).
- **Hyper-spectral** – similar to multi-spectral, these sensors collect and record data in **hundreds** of spectral bands. Allows for spectral discrimination by species, materials, and environmental conditions.<sup>166</sup> Examples include: EO-1 (US), HRST (US), and ARIES (Australia).
- **Ultra-spectral** – similar to hyper-spectral, these sensors theoretically collect and record data in **thousands** of spectral bands. Allows for identification and discrimination of subtle spectral details of materials, vapors, and aerosols.<sup>167</sup>

Spread potentially over many thousands of color bands, these systems could reveal changes in landscape (e.g. minefields, mass graves, crop failures, and

---

<sup>165</sup> Multi-spectral Users Guide. (Newington, Virg., 1995), 1-5.

<sup>166</sup> Ibid., 1-6.

<sup>167</sup> Ibid.

construction), read the chemical composition of effluents and materials (e.g. chemical, nuclear, and other industrial facilities), and see through virtually any type of camouflage. Properly employed, these systems could be used for near real time for arms control verification, controlling the spread of WMD, and, in the case of multi-spectral sensors, have been used to provide information for war crimes investigations. The key limitations of such systems are their inability to see through various types of clouds or other parts of the atmosphere when the moisture content is high. Also, costs associated with data interpretation by computer are high.

**Radar.** Atmospheric moisture, ozone, and other gaseous molecules like methane can obscure or reduce the effectiveness of spectral systems like panchromatic and infrared systems. However, these have little impact on microwave energy or radar systems.<sup>168</sup> Thus space-based synthetic aperture radar (SAR) systems have the potential to take pictures regardless of weather or lighting conditions. Examples of such radar systems include the Canadian Radarsat and the European Space Agency's Earth Resource Satellite (ERS). These systems can be used to determine ground characteristics, vegetation characteristics, and to detect objects through various types of camouflage. Newer systems may in the future make the oceans and various types of soil (e.g. dry sand) transparent.<sup>169</sup>

These future systems could be used to monitor endangered species such as whales, detect submerged vessels, and locate buried treasures or command and weapons storage bunkers. The limitations associated with current and future systems is the high-power requirements to operate the system, the large data storage systems required to store the information, the high capacity communications necessary to download the information, and the processing and analysis system required to interpret the "blobs" of imagery.

For horaeists, preservationists, and synergists, multiple UHR sensors flying in carefully constructed orbits could provide immediate detection and feedback of rogue-nation operations, status on wildfires, instant observation of local drought conditions, refugee flows, etc. that might affect individual states or that could lead to instability in

---

<sup>168</sup> Harold Hough, *Satellite Surveillance* (Port Townsend, Wash.: Loompanics Unlimited, 1991), 48.

<sup>169</sup> *Ibid.*, 49.

the international security environment. Such immediacy could provide NGOs, diplomats, military strategists, and others with sufficient information to provide a more coherent response or provide options that will allow a variety of courses of action. The bottom line: anyone with the resources could buy UHR imagery to achieve a state of space-derived transparency. Table 4-1 provides a list of the current and projected space-based sensors available for tasking by horaeist, preservationist, and synergist groups.

**Table 3. Commercial Remote Sensing Systems**

SYSTEM	OWNER	SENSOR	YEAR OF LAUNCH	SPATIAL RESOLUTION (METERS)								STEREO TYPE	SWATH (KM)	GLOBAL REVISIT (DAYS)	
MULTISPECTRAL SENSORS															
IRS-1C, D	India	M & P	1995, 1997	PAN	Thematic Mapper Bands							Radar	C/T	70, 124	48, 24
					Visible & Near IR			Short-Wave IR		Thermal IR					
					1 4	2 6	3 23	5 23	7 23	8 23					
IRS-P5 IRS-2A	India	M	1996 1999	6		6 23	6 23	6 23	23			C/T	125, 22		
SPOT 4	France	M & P	1998	10		20	20	20	20			C/T	26		
CBERS	China/Brazil	M & P	1998, 1999	-, 8	20	20	20	20	80	80	160	C/T	120*	26	
Landsat 7	US	M & P	1998	15	30	30	30	30	30	30	60		185	16	
EOS AM-1	US/Japan	M	1996			15	15	15	6 @ 30		5 @ 90	F/A	60	49	
R21A, B, C, D	Resource 21	M	2000		10	10	10	10	20				200*	4 Four satellites planned to provide 3.5-4 day global repeat coverage	
UHR SENSORS															
EarlyBird2	EarthWatch	M & P	1998	3		15	15	15				F/A	36	120	
IKONOS 2	Space Imaging EOSAT	M & P	1999	1	4	4	4	4				F/A	12	247	
QuickBird 2	EarthWatch	M & P	1998	1	4	4	4	4				F/A	20	148	
ORBVIEW3	ORBIMAGE	M & P	1999	1&2	8	8	8	8				F/A	4 & 8	740, 370	
SPIN-2	Russia+	P	1996, 1997	2, 10								F/A	180, 200		
EROS-A	Imagesat (West Indian Space)	P	1998	1.5								F/A	14	211	
EROS-B		P	1999	1								F/A	20	148	
IPS-P6	India	P	99	2.5								F/A	10	298	

HYPERSENSPECTRAL SENSORS															
EO-1	US	H & M	1999		128 Bands @ 30			256 Bands @ 30					15	200	
HRST	US	H	2000	5	210 Bands @30								30	100	
ARIES	Australia	H	2000	10	32 Bands @ 30			32 @ 30				15	200		
RADAR SENSORS															
RADARSAT	Canada	SAR	1995								10 C-Bnd		50-500		
ERS	ESA	SAR	1998								25 C-Bnd		100		

Source: Derived from Mitretek, 16 February 1998

## Key

P – Panchromatic  
M – Multi-spectral  
H – Hyper-spectral  
F/A – Fore/Aft Stereoscopic  
C/T – Side to Side Stereo  
SAR – Synthetic Aperture Radar

- \* Swath is achieved by two side-by-side sensors
- + Photographic film return system



## Summary

Since 1992, the commercial space industry has started to find its footing. Horaeists, preservationists, and synergists with resources can purchase UHR imagery through the Internet or via telephone – with it, they potentially have an observation power on par with the most spacefaring nations. Given that the regulators, particularly the United States government, have allowed formerly restricted UHR technologies and resolution to enter the commercial market, vendors have developed imaging capabilities similar to those once held only by well-resourced spacefaring nations. Their products may provide users with new powers to take action or to enhance their effect on political, foreign, and military policy. These users range from governments, militaries, and benevolent NGOs to malevolent forces bent on industrial espionage and terror.

As with any specialized technologies, there are risks associated with allowing so many diverse groups access to the images – whatever the governments who developed the technologies before used them for will likely be how they are employed by non-traditional users. For horaeists and synergists, this opens up a world of new possible environmental, humanitarian, arms control, and more applications. For preservationists, this erodes traditional state power, transferring it to groups whose legitimacy cannot be assured. UHR imagery can, if misused, threaten national security. For synergists, this opens the possibility that states, militaries, and benevolent groups might be better prepared to act in advance of conflict, perhaps strengthening security, and may introduce a new level of efficacy into traditional humanitarian operations.

Commercial vendors, while subject to government regulations, have limited their activities to commercial communications and remote-sensing satellites and technology as these promise the greatest return on investment. This chapter examined panchromatic, spectral, and radar imaging systems highlighting their applications and noting their limitations. Perhaps the most common limiting factor between all commercial systems to date is the cost to build, orbit, and operate them.

There is no guarantee that the market will support the investment thus there has not been the predicted “explosion” of commercial space systems. This isn’t to suggest that it won’t happen in the future however, it serves as a lesson in capitalism where market forces dictate future investment. These forces are constrained by the policies established by the regulators who

have an eye towards creating a viable market while preserving their own security. Chapter 5 will explore the impact of the policies on space-derived transparency and ways to mitigate its potential impact on political, foreign, and military policies.

## Chapter 5

### POLICY IMPLICATIONS FOR AND OF SPACE-DERIVED TRANSPARENCY

*In the case of high-resolution remote sensing satellites, however, the only practical choice is to embrace emerging transparency, take advantage of its positive effects, and learn to manage its negative consequences.*

—Dr. Ann M. Florini, *Commercial Satellite Imagery Comes of Age*

*. . . the military of the next century must plan its operations with this potential transparency in mind, and it must develop sophisticated countermeasures.*

—General Thomas S. Moorman, *The Explosion of Commercial Space*, 1999

*As commercial space systems provide global information and nations tap into this source for military purposes, protecting (as well as negating) these non-military space systems will become more difficult.*

—United States Space Command, *Vision for 2020*

On 26 May 1999, the Carnegie Endowment for International Peace sponsored a conference about the proliferation of commercial UHR imagery entitled *No More Secrets? Policy Implications of the New Commercial Remote Sensing Satellites*. During this conference, William E. Stoney of Mitretek Systems delivered his address entitled “Existing and Planned Land Imaging Satellites – The Genie is Out of OUR Bottle.” Drawing on his research on behalf of NASA’s Stennis Center for Land Remote Sensing, Mr. Stoney noted the following:

- Satellites are global data systems that make it possible and practical for organizations and individuals anywhere to “see” everywhere at any time in the detail required for dealing with human scale activities
- Used wisely they will accelerate the globalization of commerce, provide the scientific understanding that will enable governments to deal rationally with environmental issues, and help maintain peace by reducing paranoia and broadening the effective peace keeping participant base beyond government institutions.<sup>170</sup>

In essence, commercial UHR imagery is available to anyone, advances human understanding of his environment, and in particular enables NGOs to take on functions normally performed by governments – articles of horaeist faith and preservationist fears. From Mr. Stoney’s perspective, it is also the foundation for synergy – melding benevolent intent with a quest for stability in the international security environment.

Mr. Stoney noted that the policy debate regarding commercial space imaging systems should begin with the recognition that:

- Restrictions on commercial systems have probably already stimulated foreign commercial and government development.
- Of the 18 commercial UHR systems providing better than 5-meter resolution, nine are foreign owned. Of the 11 proposed new systems with resolution better than four meters, 10 are non-US.
- The number of systems that could potentially help an adversary track troop activity arguably could include all 30 satellites of 10 meters and better. One important caveat is that clouds will prevent optical systems from being tactically useful at any resolution without the ability to get and coordinate data daily from a minimum of three satellites.<sup>171</sup>

In short, US government regulation and policies since 1992 have both created a market for UHR imagery while at the same time sparking concern among current and potential customers that their access could be denied. Arguably, horaeists are likely to use UHR imagery however the largest element of the customer base will likely be apolitical commercial users such as farmers, city planners, insurance adjusters, real estate agents, etc. The concerns of horaeists and apolitical commercial users and their

---

<sup>170</sup> William E. Stoney, Mitretek Systems, Address. Carnegie Endowment for International Peace Conference, “Existing and Planned Land Imaging Satellites – The Genie is Out of OUR Bottle” (26 May 1999).

<sup>171</sup> Ibid.

potential purchasing power is already having an influence that may undercut preservationist efforts to control access and limit the use of UHR imagery for non-traditional users. Thus the natural tension between the horaeist and preservationist camps has spawned policies that appear to have created an imbalance, exacerbated by foreign UHR systems, in favor of horaeists.

What are the policies that caused this imbalance? Missing from Mr. Stoney's presentation is what happens when, rather than if, malevolent forces begin using UHR imagery to advance their agenda? Could this imagery be misinterpreted or used incorrectly by foreign governments, benevolent NGOs, or the media? In light of the CNN and WWW effects, given the typical NGO or a malevolent force's desire for traditional and non-traditional media attention, their willingness to embrace new technologies, the growing influence of NGOs, and that non-traditional users are now using UHR imagery, what are the possible implications for US policy formulation?

## **Purpose**

This chapter explores the impact of the policies on space-derived transparency and ways to mitigate its potential impact on US policy. Additionally, this chapter specifically examines the increasing influence of NGOs, now armed with UHR imagery and the power of space-derived transparency, in policy formulation.

## **Tensions and Balances**

There exists a natural tension between horaeists and preservationists. Horaeists desire unfettered access to UHR imagery while preservationists seek to limit their access. American regulators, in response to administrative and legislative action such as the 1992 Land Remote Sensing Policy Act, the 1994 Presidential Decision Directive-23, and the 1998 Commercial Space Act, have set the stage for the increased use of UHR imagery by non-traditional users. In essence they have made it possible for anyone or any group with the proper resources to play a role in space-derived transparency. Thus, commercial UHR imagery creates a rather delicate balance for regulators between economic and technological preeminence in the field and the possible risks to national security.

While United States space policy is designed to “strengthen and maintain the national security of the United States” and to “enhance the economic competitiveness, and scientific and technical capabilities,” it is concerned with preserving the US economic and technological position without compromising security.<sup>172</sup> This is a tall order considering that US space policy affirms that space systems are “national property with the right of passage through and operations in space without interference” and that “purposeful interference with space systems shall be viewed as an infringement on sovereign rights.”<sup>173</sup> As noted in chapter 4, a complicating factor is the prohibitively high cost of space access. Companies such as EarthWatch Inc. and Space Imaging Corporation solicit venture capital from non-US investors to build and orbit multi-million dollar UHR satellites.

Foreign investment complicates US attempts to control access to commercial UHR imagery through policies and commerce laws. Consequently, crafting policies that do not overly restrict commerce, or provide loopholes that potentially threaten national and economic security is a daunting task. Another complication in the delicate balance is the power of horaeist and synergist user dollars. While not yet a torrent, increasing demand for UHR imagery products and fear of potential denial of service by US regulatory policies has, perhaps unintentionally, forced users to diversify their sources. While US owned systems still have the best resolution and support infrastructure, foreign owned systems don’t have the same regulatory restrictions that US systems do.

Horaeist and synergist concerns and actions aside, the bottom line for preservationists remains national security – and the US is obligated to exert its influence to control proliferation of any technology that might threaten national security. The missile technology control regime (MTCR) and the nuclear non-proliferation treaty (NPT) are two examples of measures the US supports in order to restrict the flow of technologies and weapons that might threaten US national security. For preservationists, technologies providing space-derived transparency shouldn’t be treated differently. Dr.

---

<sup>172</sup> National Space Policy Fact Sheet. 19 September 1996. on-line, Internet, 6 March 2001, available from <http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/html/fs/fs-5.html>.

<sup>173</sup> Ibid.

Florini identifies three preservationist methods of control: unilateral measures, bi- and multi-lateral approaches, and shutter control by other means.<sup>174</sup>

### Unilateral Measures

**Policy.** Presidential Decision Directive (PDD) – 23, is an example of a regime that supports what preservationists deem as reasonable restrictions and controls on the acquisition and use of space-derived information for commercial users. Signed by President William J. Clinton on 10 March 1994, PDD-23 is designed “to support and enhance US industrial competitiveness in the field of remote sensing space capabilities while at the same time protecting US national security and foreign policy interests.”<sup>175</sup> While citing the need to maintain the lead in commercial remote sensing and highlighting the benign and benevolent applications of commercial space systems, PDD-23 imposed a series of restrictions to protect US national security interests to include:

- Maintaining a record of all satellite taskings for the previous year and granting the government access to the record.<sup>176</sup>
- Refraining from making changes to satellite operational characteristics without formal approval from the Department of Commerce.
- Limiting data collection and distribution when directed by the Secretary of Commerce after consultation with the Secretaries of State and Defense (SHUTTER CONTROL). This determination is made if national security, international agreements, and/or foreign policy may be compromised.
- Using only US government approved encryption devices during periods when access must be denied based on direction of the Secretary of Commerce. The US government must have access to the data downlink.
- Notifying the US government in advance of intent to enter into significant or substantial agreements with new foreign customers.<sup>177</sup>

Implications. This policy and the licensing agreements are designed to safeguard US national security. From a realist preservationist standpoint, these are reasonable and

---

<sup>174</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 27-30.

<sup>175</sup> Fact Sheet: Foreign Access to Remote Sensing Space Capabilities,” (Washington D.C.: Office of the Press Secretary, The White House, 10 March 1994).

<sup>176</sup> This is a form of traditional transparency. What makes it most interesting is that it is a transparency requirement established by preservationists, a requirement that some horaeists object to on privacy grounds. In this case, both camps are arguing opposite what we might expect their normal positions to be, with preservationists supporting transparency and horaeists against it.

<sup>177</sup> Fact Sheet: Foreign Access to Remote Sensing Space Capabilities,” (Washington D.C.: Office of the Press Secretary, The White House, 10 March 1994).

necessary, although not sufficient to guarantee that malevolent forces will not gain access to UHR imagery. Although horaeists argue that if shutter control is ever implemented it will drive non-traditional users to foreign vendors, preservationists claim they are necessary to protect US security interests in the event that national security is threatened or when obligations or foreign policy may be compromised. In short, the national interest trumps all other concerns.

Another concern is that the US government could become a disproportionately large consumer of commercial UHR imagery thereby creating, as Lt Col Grundhauser describes, “a destructive co-dependency that could diminish incentives for innovation and encourage governmental intrusiveness and regulation.”<sup>178</sup> In essence, US vendors could become so dependent on government business that they could be tempted to “throttle back” on innovation, thereby losing their technological pre-eminence and subjecting themselves to greater regulation. This could ultimately result in loss of market-share, decrease overall revenues, and jeopardize the US commercial imagery industry.

One other concern is PDD-23’s status as a classified document so most users have no idea what specific trigger criteria for shutter control, if any, have been established. If none are established, then there is a possibility that the threshold for implementing shutter control could be set so low that virtually any excuse could be used to deny service to certain users. This concern was raised on 24 July 1996 by Mark Brender, Chairman of the Radio-Television News Directors Association (RTNDA) Remote Sensing Task Force during testimony before the House Subcommittee on Space and Aeronautics.

His concern is that PDD-23 threatens the constitutions, First and Fourth amendment guarantees for a free press and search and seizure protections for space-based newsgathering.<sup>179</sup> Arguing that the current policy gives too much power to the executive and violates the “clear and present danger” standard required by courts, Mr. Brender notes that shutter control as a form of prior constraint can only be “exercised after the government has obtained requisite judicial approval.”<sup>180</sup> In his view it amounts to a

---

<sup>178</sup> Lt Col Larry K. Grundhauser. "Sentinels Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," 77.

<sup>179</sup> Testimony. Mark Brender, Chairman, Radio-Television Directors Association Remote Sensing Task Force before U.S. House of Representatives Subcommittee on Space and Aeronautics, 24 July 1996. On-line, Internet, 6 March 2001, available from [http://www.house.gov/mark\\_brender.htm](http://www.house.gov/mark_brender.htm)

<sup>180</sup> Ibid.



government intrusion into private business and is “blatant commandeering and expropriation of property of a private entrepreneur operating not in the role of a government contractor.”<sup>181</sup> His fear is that if shutter control is ever implemented that the government will be tempted to continue exercising this control thereby preventing the media, private ventures, NGOs, etc. from ever purchasing UHR imagery thus imposing censorship, infringing on property rights, and invading privacy.

For a member of the press to lecture anyone on privacy rights is hubris. The media has generally shown itself more committed to the “public’s right to know” than to individual privacy rights. Space UHR imagery by its nature “violates” sovereignty and with ever increasing resolution may violate individual privacy. Space-derived transparency opens closed areas and can expose private actions. However, without clear standards that withstand constitutional scrutiny, his first amendment argument about shutter control appears to have some merit.

It is this fear that creates greater tension between the camps and has arguably created a market niche that foreign providers can exploit. Mr. Brender is sounding a warning that should shutter control ever be implemented by the United States, the media and others will simply take their business elsewhere. However, to date the United States has never implemented shutter control. If shutter control has the potential to be ineffective and possibly drive users from the domestic market, what other approach is there to exert control over the dissemination and use of UHR imagery?

### Bi- and Multilateral Measures

**Policy.** For a nation trying to maintain the lead in commercial UHR imagery, unilateral measures to control or limit imagery dissemination can create demand outside the US market. These measures may provide opportunities for foreign vendors to take the lead thereby undercutting US vendors, weakening the intended effect of unilateral measures, and potentially lessening US government influence in the global market. The logical alternative then is for the US to press for multilateral controls by suppliers or on users. The other course might be to work with the regulators of foreign systems to

---

<sup>181</sup> Ibid.

encourage them to adopt state-sponsored shutter control policies similar to PDD-23 or enact agreements to voluntarily restrict data.

For example, during the Gulf War, the United States worked with France to deny the Iraqis access to SPOT imagery. As France was a member of the coalition force, the French government agreed to deny service to the Iraqis for the duration of the crisis. While not necessarily a *quid pro quo*, the US government purchased approximately \$6 million in images from SPOT that could be considered compensation for potential French financial losses.<sup>182</sup> Another example is the Kyl-Bingaman amendment that was included in the 1997 National Defense Authorization Act. Lobbied hard by Israel, Congress adopted this amendment in order to prohibit US companies from collecting or selling imagery of Israel unless “such imagery is no more detailed or precise than satellite imagery . . . that is routinely available from other sources.”<sup>183</sup>

**Implications.** While prervationists see such cooperation as in the Gulf War case and the legislative action as promising, horaeists counter that such success is short-lived. Given the globalized economy today, most nations have powerful market incentives to sell UHR imagery. Other nations have less to fear from its misuse. As the world’s only superpower, the US tends to attract the ire of malevolent forces whose aims run counter to US interests and policy. Thus it is more likely that the US will suffer ill effects from the improper (in the US perspective) use of UHR imagery rather than the nation providing the imagery. Outside of the US, most would consider this one of the unpleasant costs of “doing business.”

### Shutter Control by Other Means

**Policy.** In an era where non-state actors and non-traditional allies can purchase space-derived transparency capabilities similar to the United States, they have the potential to intentionally and even inadvertently damage US national security and in doing so, threaten global stability. Thus, from a preservationist view, there is an even greater need to control and if necessary, to deny access to these systems. According to Dr. Florini, there are two means that remain to control access to UHR imagery: direct

---

<sup>182</sup> Lt Col Peter L. Hays, Ph.D., “Transparency, Stability, and Deception: Military Implications of Commercial High Resolution Imaging Satellites in Theory and Practice” (19 February 2001).

action or simply accepting that space-derived transparency is the way of things.<sup>184</sup> Preservationists favor the former while horaeists and synergists prefer the latter.

For preservationists, the macro check on the power of groups to benefit and exploit space-derived transparency is direct action in the guise of space control. Space control is a means of protecting a nation's space capability – in this case, preserving the use of space for the United States while providing the ability to deny its use to others. Air Force Doctrine Document 2-2, defines space control as:

. . . the means by which space superiority is gained and maintained to assure friendly forces can use the space environment while denying its use to the enemy. To accomplish this, space forces must survey space, protect the ability to use space, prevent adversaries from exploiting US or allied space services, and negate the ability for adversaries to exploit their space forces.<sup>185</sup>

The means to prevent adversaries, NGOs, and malevolent forces from using and exploiting space-derived information are varied and evolving – some have permanent effects while others are reversible. One previously mentioned well publicized case of reversible effect denial took place during the 1991 Gulf War when the United States purchased all available time and imagery from the French SPOT Imagé satellite to preclude the Iraqi's from downlinking imagery of coalition force deployments. This means to control and deny an adversary's or NGO's ability to realize any benefit from space-derived transparency is considered direct action. Forms of direct action include:

- Denial – a refusal to comply with or satisfy a request or purposeful action taken to prevent an imaging satellite from taking pictures – denial has the advantage of being reversible.
- Requesting the satellite service provider to deny requests for imagery – failure to do so could result in revocation of a license to operate (a coercive form of shutter control). The target could still get data through a third party or through a deceptive “false flag” request.
- **Purchasing** all available imagery or the time the imager might be in view of an area of interest for the adversary (an expensive form of shutter control).

---

<sup>183</sup> “Prohibition on Collection and Release of Detailed Satellite Imagery Relating to Israel,” National Defense Authorization Act for Fiscal Year 1997, P.L. 104-201, Sec. 1064(a), Washington D.C., 1996.

<sup>184</sup> Yahya A. Dehqanzada and Ann M. Florini, *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*, 27.

<sup>185</sup> Air Force Doctrine Document (AFDD) 2-2, *Space Operations* (August 1998), 42.

- **Jamming** the transmission capability of the imager – though reversible, this is purposeful infringement on a sovereign space system, such action violates current US space policy.
- **Blinding** the imager using lasers or other dazzling devices – can be both destructive or reversible purposeful infringement.
- **Deception** takes place on the ground and entails the use of maneuvering away from the imaging location, employing camouflage and decoys, or wrapping critical facilities and objects in reflective materials.
- **Degradation** can be caused by blinding satellites, taking actions that force a satellite to maneuver thus burning up fuel, or interrupting routine housekeeping commands from ground stations thereby preventing the satellite from maintaining its position. These effects can be reversible.
- **Destruction** of ground stations or the satellite.

**Implications.** The policy implications of “purposeful interference” could spark a backlash from national governments and non-governmental groups. These organizations would condemn any action that might deprive them, even temporarily of access to commercial imagery. Condemnation would be especially strong from those governments owning satellites subject to interference. Groups and non-spacefaring nations would likely view such interference as “harmful interference” and seek consultations for redress and protections pursuant to Article IX of the Outer Space Treaty.<sup>186</sup> Their aim is generally to achieve respect and protections similar to those enjoyed by Russia and the United States since 1960.

Some non-spacefaring nations and many groups would seek to include provisions in trade agreements and treaties binding the United States to respect their right to purchase UHR imagery. In Lt Col Grundhauser’s opinion, the US ought to sponsor “a legally binding treaty on the rights and obligations of remote-sensing countries with respect to data distribution.” Spacefaring nations would likely seek treaty provisions about jamming, blinding, and most especially, destruction. As Dr. Florini notes “if the United States could live with Soviet spy satellites, it is hard to see that it would casually bring down international opprobrium on itself by destroying civilian satellites.”<sup>187</sup> Beyond

---

<sup>186</sup> Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies (1967): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH500.html>

<sup>187</sup> Ann M. Florini and Yahya A. Dehqanzada, “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites.”

opprobrium, by engaging in direct action methods, the US could jeopardize its own commercial industry because its actions would encourage other nations to employ similar methods against US commercial, military, and national satellite assets and supporting ground infrastructure. This potential jeopardy makes the US cautious in peacetime however, in a war situation where the risks to forces from enemy use of space “eyes” was deemed too great, the US may have no choice but to take direct action.

The bottom line for horaeists and synergists is that the “existence of high-resolution commercial imagery is simply a fact of life that US policy makers must accept.”<sup>188</sup> Non-spacefaring nations and other non-traditional users of UHR imagery will be likely to take advantage of this technology and use it as anyone with a better gadget would use it – to gain an advantage. Whether or not this imagery will be used for monitoring, verification, or intelligence purposes and then employed in some inappropriate or harmful way is not certain nor are the effects of such use. According to Andrew Rathmell:

The rise of open sources and the diffusion through globalized commercial channels of information communications technology (ICT) for gathering, analyzing, and disseminating intelligence have put powerful intelligence capabilities into the hands of even NGOs and technologically backward and impoverished countries.<sup>189</sup>

Clearly it behooves US policy makers to plan as though adversaries and NGOs can now see us in much the same way as we can see them.

This has implications for US policy in terms of types of policies and policy players. Perhaps the greatest implication of UHR imagery will likely be greater empowerment of governments of developing nations, non-governmental organizations, and malevolent forces and their rising influence will affect policy. As was noted in Chapter 4, some NGOs are becoming important forces in governance and verification and are demanding and having a greater role in and influence on policymaking. Of all the groups studied, many imagery-savvy NGOs will increasingly affect policy formulation. Of these, how is their influence felt, what are the policy implications, and can something be done to mitigate the effects?

---

<sup>188</sup> Lt Col Larry K.Grundhauser. "Sentinals Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," 78.

## NGO Policy Players – Potentials and Implications

United States political, foreign, and military policy is typically focused on governments, their associated institutions, and their policies. In recent years, non-governmental organizations, through the tacit assent of some governments and the United Nations, have been gaining power and influence to the point that they are becoming players in shaping, implementing, and executing national policies. As was noted earlier, there are more than 17,000 NGOs operating in the world. This is an increase of more than two thousand since the year 2000.<sup>190</sup> Some estimates range as high as 26,000 transnational NGOs and millions more exist within national borders.<sup>191</sup> A 2000 RAND study, *Strengthening the Partnership: Improving Military Coordination with Relief Agencies and Allies in Humanitarian Operations*, categorizes NGOs as follows:

- **Core-Team** – highly competent, broadly capable, and predisposed to cooperate with the military. Examples: American Red Cross (International Services Department), Catholic Relief Services (CRS), and World Vision Relief and Development.
- **Core-Individual** – highly competent, broadly capable, but less eager to cooperate with the military. Examples: Médecins Sans Frontières (Doctors Without Borders) and Oxford Committee for Famine Relief (OXFAM).
- **Specialized** – highly competent and capable in select functional areas. Examples: Agricultural Cooperative Development International/Voluntary Overseas Cooperative Assistance (ACDI/VOCA), Christian Children's Fund (CCF), and Food for the Hungry International (FHI).
- **Advocacy** – dedicated to promoting human rights but not normally providers of material assistance. Examples: Amnesty International, Physicians for Human Rights (PHR), and the United States Committee for Refugees (USCR).
- **Minor** – competent but having less capability than the core-team. Most NGOs fall in this category. Most are unknown even to specialists, may have political connections, and are the most likely to cause problems in relief operations, organized responses to crises, monitoring, etc.<sup>192</sup>

---

<sup>189</sup> Andrew Rathmell in *The Verification Yearbook 2000*, 221.

<sup>190</sup> Yearbook of International Organizations (by type) 1999/2000 edition published online by the Union of international Associations: On-line, Internet, 31 March 2001, available from <http://www.uia.org/>

<sup>191</sup> "The Non-governmental Order," *The Economist* (11 December 1999), 21.

<sup>192</sup> Daniel Byman, et al, *Strengthening the Partnership: Improving Military Coordination with Relief Agencies and Allies in Humanitarian Operations*, (Santa Monica, Calif.: RAND, 2000), 64.

Non-governmental proliferation and influence has grown to such an extent that the United Nations Economic and Social Council (ECOSOC) has a Committee on Non-governmental organizations that grants international status to NGOs. For example, according to RAND, the 1992 UN Conference on the Environment and Development (Rio Conference) attracted more than 18,000 NGOs with 1,400 being officially recognized by the conference.<sup>193</sup> But, status can be a fleeting thing depending on the committee makeup. Among the 19 nations on the 2001 committee are Russia, People's Republic of China, Sudan, Cuba, Pakistan, Algeria, Bolivia, and Columbia – none of whom are champions of human rights or fans of NGOs. However, the groups officially sanctioned by the committee comprise a 58-page list. Such recognition by ECOSOC provides a degree of credibility to individual NGOs, increases their stature, and in many ways conveys a sense of entitlement to “take a seat at the government’s table.”

This sense of entitlement and empowerment has given rise to Dr. Florini’s depiction of “transnational civil society.” and its role in global governance.<sup>194</sup> Objectively, transnational civil society groups have always been an invisible force in governance and since the 1950s and the birth of nuclear arms control groups, it has become a more visible force in national policy development. Thus, despite preservationist protests, NGOs are the new policy players that governments are considering and even consulting with when formulating policies.

Within the context of a transparency, Dr. Florini and others note that benevolent NGOs and malevolent forces now use UHR imagery in their quest to develop a more civil, democratic, globalized and transparent world. For horaeists, space-derived transparency provided by UHR imagery is an ever more important resource in this quest. This has policy implications beyond what was discussed previously. It begins with the horaeist view that transnational civil society is a force for positive change. Such thinking elevates the role of NGOs. Preservationists contend that since transnational civil society

---

<sup>193</sup> Ibid., 68.

<sup>194</sup> Dr. Florini’s work with the Rockefeller Brothers Fund, the Brookings Institution, the United Nations Association of the USA, and her work as a consultant for the World Bank and the World Resources institute frames much of her thinking about this issue. She now directs the Carnegie Endowment for International Peace Project on Transparency and the Japan Center for International Exchange Projects on Transnational Civil Society.

includes malevolent forces, policies must include methods and means minimizing their potentially negative effects.

### **Benevolent Conscience or Malevolent Threat?**

Horaeists view NGOs as the “global conscience to represent broad public interests that do not readily fall under the purview of individual territorial states or that states have shown themselves wont to ignore.”<sup>195</sup> They argue that NGOs are becoming more influential in governmental policy making, sometimes even having a seat at the table. Dr. Florini writes: “the power of transnational civil society manifests itself at virtually every stage of policy making, from deciding what issues need attention to determining how problems will be solved to monitoring compliance with agreements.”<sup>196</sup> In what preservationists view as self-serving publicity, horaeists argue that they, more than government, are the trusted leaders in a quest to build a more civil society.<sup>197</sup>

According to Dieter Deiseroth, author of *Societal Verification: Wave of the Future?*, NGOs, rather than governments, are the new leaders of “societal verification” efforts in arms control, environmental law, economic development, etc. ensuring compliance with treaties and laws within national borders, transnational regions, and internationally. These representatives of the citizenry are “taking the lead from government” rather than relying on national “experts” inside government.<sup>198</sup> The problem with this assertion is that unlike government, NGOs are essentially unaccountable to any regulatory body short of their own membership. Preservationists somewhat grudgingly acknowledge that benevolent groups can be helpful in dealing with humanitarian issues but as self-appointed vanguards of particular interests, they are more often a hindrance when they range into other areas.

This preservationist concern is not unfounded. According to Dieter Deiseroth, NGOs are typically interested in monitoring:

- **Commercial and non-commercial companies.** Examples of what they look for include: pollution, bribery, and hazardous/defective products.

---

<sup>195</sup> Ann M. Florini, *The Third Force – The Rise of Transnational Civil Society*, 4.

<sup>196</sup> Ibid.

<sup>197</sup> Dr. Ann Florini. *The Third Force: The Rise of Transnational Civil Society*, 211.

<sup>198</sup> *The Verification Yearbook 2000*, 265.



- **Government departments and agencies.** Examples include: treasury, land management, and justice.
- **Military industrial complex.** Examples include: military and defense industries.
- **Public and private laboratories.** Examples include national laboratories for weapons development and commercial manufacturers.
- **Police and security forces.** Examples include: Interior ministry forces, the FBI, and other similar organizations.
- **National governments.**
- **International bodies.** Examples include the United Nations and the World Trade Organization (WTO).<sup>199</sup>

While many NGOs seem rather benign, some are no more than exoskeletons for a variety of groups focused on different causes. Various groups, supporting disparate causes, employing different methods of action, with limited resources, and a myriad of other challenges makes it unlikely that a parent organization will realize its goals.

For example, the virtual “Stop the FTAA” movement was organized around one theme, stop corporate globalization, and one April 2001 meeting in Quebec, Canada. Their mission was to disrupt the meeting between the 34 leaders of the nations of North and South America attempting to negotiate the Free Trade Area of Americas treaty to create a hemispheric free trade zone. The movement opposed to this treaty included Campus Greens, League of Radical Toy Airplane Pilots, Earth Day, Revolutionary Anti-capitalist Bloc, Pagans, International Anarchist Communist Bloc and Black Bloc,<sup>200</sup> and Knitters of the World, Unite and Takeover.<sup>201</sup> The convergence of benevolent and

---

<sup>199</sup> Ibid., 266.

<sup>200</sup> Black Bloc is the anarchist group identified by police and other activist groups as most responsible for the violence and vandalism at the 1999 WTO conference in Seattle, Washington. They advocate violence to, as they describe it, “smash the establishment.”

<sup>201</sup> Stop the FTAA website. On-line, Internet, 16 April 2001, available from <http://www.stopftaa.org>. Each organization has a different agenda and employs different methods. A *Washington Times* article by Carter Dougherty analyzed the participants of the “Stop the FTAA” movement (<http://www.stopftaa.org/>) and explored their methods. What he found was that many of these groups are opposed to each other and that while many participants are planning peaceful protests, others like the “Summit of the Americas Welcoming Committee” rely on what they term “diversity of tactics” which means, they practice violence. This group and the “Anti-capitalist Convergence” or CLAC usurped the leadership of the original movement organizers and employed violence, to include brick and “molotov cocktail” attacks on police and vandalism to disrupt the conference. Their goal, like many action-oriented NGOs is to intervene in processes, mostly political and corporate, that in their view exclude ordinary citizens, forcing issues into the public agenda in order to create a moral crisis that spurs action. Although some meetings at the Quebec

malevolent groups in this case and others such as the arson and bombing attacks by the environmental group Earth Liberation Front, make “benevolent” NGOs hardly look any different than those groups that inhabit the darker side of “transnational civil society” – the malevolent forces.

### **“Global Idiots” or a Coercive Force?**

Today’s NGOs are one of three types of international actors with an influential role in policy development, the others being government and the private sector.<sup>202</sup> Governments have coercive power while NGOs may exert a coercive influence. The government’s coercive power is derived from their control of the military and state police organs and they have enormous resources to draw from. NGOs have some economic resources. Coercive influence comes from their ability to shape public perception and their (supposed) moral authority on specific issues.<sup>203</sup> According to Dr. Florini, civil society (NGOs) shapes the norms of international behavior in two ways:

- Directly by persuading government and the private sector to change their minds and “do the right thing.”
- Through coercion by threatening to go public with embarrassing information that might spark a public backlash against the government or the private sector interest (transparency).<sup>204</sup>

Just because they claim to have such power doesn’t guarantee that NGOs will exercise it responsibly or properly. In fact, there’s reason to doubt that NGOs will ever have the influence they claim to have now or believe they will have in the future. P.J. Simmons of the Carnegie Endowment for International Peace notes that NGOs can influence national governments, multilateral institutions, international corporations, and societies by:

- **Setting agendas** – forcing leaders, policy makers, and people to pay attention to issues.
- **Negotiating outcomes** – designing treaties and breaking deadlocks.

---

conference were delayed, the protests fizzled before the end and the conference concluded with the leaders affirming their commitment to completing a free-trade agreement by 2005.

<sup>202</sup> Ann M. Florini, *The Third Force – The Rise of Transnational Civil Society*, 10.

<sup>203</sup> Ibid.

<sup>204</sup> Ibid., 11.

- **Conferring legitimacy** – promoting or withholding public and political support for an issue or action.
- **Making solutions work** – monitoring states and other actors to ensure they make good on their commitments.<sup>205</sup>

However, he also notes that while many NGOs are good at some or all of these, others are what he calls “global idiots.” He describes situations such as in Somalia and Sudan where relief organizations, intent on doing good, make alliances with and fund warring factions thereby providing these groups with the resources necessary to exacerbate the problem the NGOs are trying to solve. In the case of Rwanda in 1994, NGOs built roads to help speed relief yet in doing so, they facilitated the movement of combatants who inflicted more misery on the people the NGOs were trying to help.<sup>206</sup>

NGOs depend on their ability to persuade the public. That means they must be able to build a compelling case to support their position. As was discussed in Chapter 3, NGOs can squander their credibility. As events in Seattle and Quebec show, NGOs can be their own worst enemy in their attempt to build public support – the general public did not appreciate the lawlessness during those events, demanding the ouster of the Seattle police chief for failing to keep the peace.

Since NGOs may depend on supposedly “incontrovertible proof,” including images or pictures to support their efforts to bring about change, they become more sophisticated and embrace new technology to get their message out. New technology can create problems for the user and the subject of NGO interest. As Andrew Rathmell notes:

These technologies range from mobile, secure, satellite communications, through intelligence gathering and mission planning tools, to precision-guided munitions. If networked, media-savvy groups or state organizations take advantage of this combination of technologies they could pose serious military threats to status quo powers.<sup>207</sup>

Technological complexity, new products, and the adaptation of new technology to established processes can present significant employment problems and if improperly used, challenge NGO credibility. However, NGOs with their small size, limited bureaucracy, and finite resources often reach for advanced technical solutions that

---

<sup>205</sup> P.J. Simmons, “Learning to Live With NGOs,” *Foreign Policy* 112 (Fall 1998), 84-87.

<sup>206</sup> Ibid., 88.

<sup>207</sup> Andrew Rathmell in *The Verification Yearbook 2000*, 224.

enhance their efficacy and efficiency especially as they seek to extend their reach into previously denied areas. Thus NGOs, including the “global idiots,” are adding UHR imagery to their arsenal – a move that is wise for some groups but premature for others.

### **NGOs and UHR Imagery**

As was noted in Chapter 3, Yahya Dehqanzada and Ann Florini of the Carnegie Endowment for International Peace believe commercial satellite imagery in the hands of news organizations, NGOs, and even nations without an indigenous space program will bring profound changes to the world. Their most important conclusion is that “increased access to high-resolution satellite imagery will shift power from the former holders of secrets to the newly informed.”<sup>208</sup>

They surmise that this is the key preservationist concern – since their loss is likely a gain for horaeists and synergists. Who these horaeists and synergists are and how they will use the information and to what effect haunts preservationists. Andrew Rathmell notes:

Humanitarian, environmental, and arms control NGOs could put the imagery to good use, if they can acquire sufficient funds and the necessary expertise, but governments may be uncomfortable with the resulting shift in power from state to nonstate actors – especially if those nonstate actors include terrorists.<sup>209</sup>

The concern then is how to deal with small states or sub-state transnational actors, particularly malevolent ones who might freely exploit UHR imagery and communication technologies in order to maximize the effects of their limited resources against a larger opponent such as the United States. Could they successfully attack or at least obstruct US interests with such information?

As was noted in Chapter 2, nations like China and North Korea and other malevolent forces are becoming skilled at developing counters to these systems, such as camouflage, that will make detection difficult. It is relatively simple to deceive panchromatic imagers but much more difficult to defeat the prying eyes of advanced

---

<sup>208</sup> Refer to page 54 of this study.

<sup>209</sup> Ann M. Florini; Yahya A. Dehqanzada, “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites,” (Carnegie Endowment for International Peace, on-line, Internet, 6 March 2001), available from <http://beta.ceip.org/files/publications/NoMoreSecrets.asp>.

space hyper- and ultra-spectral sensors. As has been discussed, systematic government controls such as shutter control techniques and other more invasive and destructive denial efforts if employed, may breed more distrust of the US government, driving “activist” customers to other markets. The result may be that groups or nations with little ability to analyze imagery may misinterpret it thus giving it greater credence than it deserves.

Imagery can capture a moment of “truth” – it can, “inform authoritatively and [is] presumed to offer immutable representations of fact.”<sup>210</sup> Any misinterpretation of the image and subsequent publication of “findings of fact” may have some unintended consequences such as an enhanced CNN effect. As was noted in Chapter 3, the NGO and media track record for proper analysis of satellite imagery isn’t good but their ability to generate a CNN effect that drives policies and action, regardless of fact, is.

Robert Osterhout, Director, Spatial Information Customer Support Center, Science Applications International Corporation (SAIC), noted:

Assuming that the right imagery is collected by the right satellite, to make sense of it, photo analysts need to understand weather conditions, surface features, seasonal changes, shadows, surroundings, and differing shapes and sizes.<sup>211</sup>

Space imagery provides a unique perspective, one that requires trained and experienced analysts to interpret. As Steven Livingston notes, “there is an estimated 90 percent error rate among government imagery analysts during their first three years on the job.”<sup>212</sup> Thus, as preservationist claim, inexperienced horaeist and synergist groups are likely to misinterpret or misuse imagery in a way that could create more problems than they solve. However, by making this argument, preservationists must also realize that if benevolent groups and the media can make these errors, so too can malevolent forces. This means

---

<sup>210</sup> Lt Col Larry K.Grundhauser. "Sentinals Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," 77.

<sup>211</sup> Robert Osterhout, Director, Spatial Information Customer Support Center, Science Applications International Corporation (SAIC), statement made during the “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites” conference at the Carnegie Endowment for International Peace, 26 May 1999. On-line, Internet, 21 May 2001, available from <http://www.ceip.org/programs/transparency/RemoteSensingConf/OsterhoutPage.htm>.

<sup>212</sup> Steven Livingston, statement made during the “No More Secrets? Policy Implications of Commercial Remote Sensing Satellites” conference at the Carnegie Endowment for International Peace, 26 May 1999. On-line, Internet, 21 May 2001, available from <http://www.ceip.org/programs/transparency/RemoteSensingConf/LivingstonPage.htm>.

that the “increased” threat these groups pose when armed with this information could be mitigated by their inability to discern the true meaning of the imagery and act accordingly.

Horaeists claim to know that proper analysis and interpretation is key to ensuring that these images tell the story they want told – they argue that their desire to preserve legitimacy compels them to be accurate in order not to harm their credibility or worse, precipitate a crisis that they could be blamed for and perhaps, required to resolve. Returning to an earlier theme, they contend that the bottom line is that governments must learn to accept that properly analyzed imagery used responsibly by credible NGOs and governments may, in some instances, lead to a more stable security environment. To suggest that space-derived transparency will produce a more civilized transnational society is galling to preservationists as it assumes a factual outcome – one that cannot be supported by the evidence to date. Right now, space-derived imagery is simply an evolving tool that when used properly contributes to transparency, nothing more.

Other NGOs, whether they support political and economic reform, democratization, arms control, humanitarian relief, etc. employ similar networks and use information technologies and the media to carry their message to the masses. Their means of building a case in the future may include space-derived images and often includes space-based communications to reach a world audience. Their methodology assumes that if their message is received and understood by the masses then pressure builds and popular movements are born to bring about the desired changes. Rightly or wrongly, the coercive influence of NGOs, enabled by space-derived transparency, becomes a player in effecting policy change – not always good policy. Thus this makes for a difficult dilemma for today’s policy makers as they consider if non-spacefaring governments, NGOs, malevolent forces, and others:

- Have access to commercial UHR imagery from foreign or US sources regardless of their policy and;
- Do not have the skills and tools to properly analyze the imagery and;
- UHR imagery, whether properly or improperly analyzed, is widely disseminated and will likely produce an enhanced CNN effect.

What might the US government do to mitigate, contain, or better direct NGO policy influences?

### **An Opportunity for Synergy?**

*The United Nations once dealt only with Governments. By now we know that peace and prosperity cannot be achieved without partnerships involving Governments, international organizations, the business community and civil society. In today's world, we depend on each other.*

— Kofi Annan, UN Secretary-General

Thus far this study has dealt primarily with horaeists and preservationists arguments however, the proliferation of commercial UHR imagery technology and products affords some opportunities for synergy in space-derived transparency applications. Remote-sensing opens closed areas to inspection. The proliferation of formerly restricted communications and space imaging technology, democratization, and a more integrated world economy has interconnected societies and arguably set conditions for greater transparency and global cooperation to help deal with a myriad of problems from hunger, arms control, environmental degradation, corruption, etc. Nature seemingly abhors a vacuum so, where government cannot or will not operate or respond, the private sector and transnational civil society may. One of the tools now available to all with the means to purchase the product is commercial UHR imagery.

This technology is new to the media and horaeist groups. Their inexperience with UHR imagery to date largely manifests itself in misinterpretation and then misapplication of resources based on the faulty analysis – people make mistakes. As part of a larger strategy for dealing with NGOs in humanitarian operations, the RAND report recommends that the US government and military 1) improve information sharing and 2) improve long-term planning. Information sharing resulted in three recommendations:

- Identify NGOs with on-the-ground networks
- Minimize disruption caused by classification
- Share after-action reports and improve debriefings<sup>213</sup>

---

<sup>213</sup> Daniel Byman, et al., *Strengthening the Partnership: Improving Military Coordination with Relief Agencies and Allies in Humanitarian Operations*, 150.

Improving long-term planning resulted in six recommendations:

- Establish continuing contact with key NGOs
- Invite key NGOs into the planning process
- Develop relief packages
- Conduct more realistic exercises
- Consult with Key NGOs about emerging crises
- Transport personnel from key NGOs<sup>214</sup>

These recommendations are based on a *quid pro quo* relationship in which the information provided comes in the form of verbal and written reports and after action reporting and reviews. One of the biggest complaints of NGOs and even allied or coalition partners is that they are excluded from receiving US collected and analyzed intelligence information and that any reports provided contain so many redactions that they are essentially worthless.<sup>215</sup> Of course, as the study notes, the government must consider that NGOs frequently exchange information with each other making it necessary to redact secret information.<sup>216</sup> However, the opportunity for synergy can be found in light of these complaints and concerns and by applying RAND's recommendations to commercial UHR imagery.

First, given that the government will likely address all issues related to vital national interests, we might identify private sector ventures and key NGOs (core-team, core-individual, specialized, and advocacy) that play a particularly useful role in addressing important and humanitarian interests. The State Department's Undersecretaries for Global Affairs or Political Affairs could identify and certify these key ventures and NGOs and serve as the interagency liaison and coordinating agency. Thus the government could establish a more formalized, cordial, and habitual working relationship with these groups. Since knowledge is power, the combination of government, private, and NGO networks in areas with otherwise poor infrastructure could pay great dividends in terms of future humanitarian responses and even military interventions.

---

<sup>214</sup> Ibid., 155.

<sup>215</sup> Ibid., 154.

<sup>216</sup> Ibid.



Second, given that commercial UHR imagery is free of classification restrictions and the inherent danger of amateur misinterpretation of space-derived information, the National Imagery and Mapping Agency could analyze and provide tailored commercial imagery through the interagency liaison to key ventures and NGOs. The liaison, the NGOs, and any member of the interagency group could request analyzed imagery to support a specific purpose. The liaison would have final approval authority. The government would purchase and analyze the imagery and then provide it to the requesting agency. The NGOs would only be required to pay for images that address a need outside the scope of the interagency team. Specific processes associated with imagery acquisition, analysis, compensation, and dissemination would be negotiated within the construct of the team charter.

The advantage of this approach is that there is a better chance that the imagery will be properly analyzed allowing the government to manage, as Mr. Strobel argues, any CNN or WWW effect. The government will also have a better idea of what kind of UHR imagery is required and how it might be used and from this, perhaps develop better tactics and techniques, other than shutter control, to counter non-sanctioned or malevolent users. Additionally the government can improve the knowledge and capabilities of these key groups allowing them to better perform their tasks.

Of course there is no guarantee that these groups will use the imagery properly. There is a danger that this analyzed information will leak to malevolent forces. Also, given that some of these groups are suspicious of government and military, they may not want to be associated with government provided intelligence materials. Having NGOs in the process and sharing many of the risks associated with the operations may help them appreciate the value of some secrecy and thereby help control the information release. Unauthorized release or improper use of information should serve as grounds for NGO decertification. Offenders should be held liable under criminal and civil law depending on the nature of the offense. However, by inviting these groups to participate in the policy and solution process, government can in some cases co-opt them into “defending” important or humanitarian interests.

Finally, there is a possibility that as a tool capable of seeing behaviors and actions UHR imagery may provide some advance warning that governments, private ventures,

and NGOs might find useful to pre-empt crises or at least optimize their response. Using UHR imagery as Reliefsat does to facilitate coordinated responses to humanitarian disasters may save lives. Properly used, UHR imagery can be used to forecast droughts and famine in advance, measure the effectiveness of environmental regulation, monitor international arms flows and regional tensions, and provide indications and warning of other potential problems that may require a global response.

Non-governmental organizations are part of the policy making process. In the wake of the 1997 International Campaign to Ban Landmines, Canadian Foreign Minister Lloyd Axworthy noted that transnational civil society plays a role in diplomacy and policy saying:

One can no longer relegate NGOs to simple advisory or advocacy roles in this process. They are now part of the way decisions have to be made. They have been the voice saying that governments belong to the people, and must respond to the people's hopes, demands, and ideals.<sup>217</sup>

Flush with success, Nobel laureate Jody Williams, the director of ICBL, perhaps overstating NGO influence, defined the new role of NGOs and their relationship with government in post-Cold War era:

They challenged the world to work openly with civil society, to perhaps show the world that we no longer had to see each other as adversaries, that actually governments and civil society should dialogue, that we actually are part of the same world community and should work together for change . . . . The post cold war world is different, and we have made it different, and we should be proud that we are a superpower.<sup>218</sup>

Given this vision of the power and coercive nature of governments and the growing influence of NGOs, there is a realization that both can work together and that both have a role in policy making and transparency.

Imagery in the hands of private ventures and advocacy NGOs may bring about greater transparency compelling governments to act responsibly and even exposing the actions of malevolent forces. Properly used, space-derived transparency becomes a

---

<sup>217</sup> Address by Lord Lloyd Axworthy, Foreign Minister of Canada, to the Oslo NGO Forum on Banning Antipersonnel Landmines, 10 September 1997.

<sup>218</sup> Address by Jody Williams, Coordinator of ICBL, to the Treaty Signing Conference and Mine Action Forum, 3 December 1997.

synergistic force, a boon for horaeists and perhaps preservationists, that brings about some positive change while potentially stabilizing the international security environment.

## **Summary**

Since 1992, the proliferation of commercial UHR imagery has created tension between horaeists who see it as a transformation tool as they build a more civil society and as a threat by preservationists who fear an erosion of governmental power and perceive a threat to national security. This tension has resulted in policies to control its development and curtail the proliferation of UHR imagery to malevolent forces. These control policies focus on unilateral measures such as the shutter control advocated by PDD-23, bi- and multilateral measures to include encouraging foreign governments to adopt similar policies, and shutter control by other means including the use of active measures to deny, degrade, deceive, and destroy satellites.

Each of these policies has a common drawback in that any attempt to impose restrictions on users may result in them seeking other (foreign) markets. As noted by Mr. Stoney in his briefing to the Carnegie Endowment for International Peace in 1999, this trend has already started with the bulk of commercial imagery satellite development and operation in the next ten years being non-US. While the United States still maintains the lead in commercial imagery technology and products, this lead and market share could be ceded to less restrictive markets.

The cost of this is more than economic, it means that the United States may actually lose transparency within the commercial imagery market. This means the United States would have little insight into what is being imaged, by whom, and thus be unable to surmise the intent of various users. This potentially increases preservationist security concerns. These concerns are already heightened by the fact that NGOs and the media are embracing this technology. Their track record for accurately analyzing and using this information is suspect at best and they appear to be using this information to enter into areas traditionally within the purview of government such as arms control, economic development, and environmental monitoring.

The fact of the matter is that NGOs, like commercially available UHR imagery, are proliferating and are now a force in policy development. Rather than being simply a

cause for concern, there is a possibility that the government, private ventures, and NGOs could work together in a constructive way, employing UHR imagery to create greater transparency. The synergy created by space-derived transparency could improve the efficiency and effectiveness of global responses not only to humanitarian disasters but also allow a more tailored and predictive preemption of crises. The bottom line is that while some policy controls are necessary, UHR imagery in the hands of non-traditional users like NGOs, the media, and even malevolent forces will provide space-derived transparency – it is inevitable.

## Chapter 6

### CONCLUSION

*What's going to be done with this kind of information is non-governmental organizations are going to take it and challenge governments' interpretations of what's going on and force governments to act in situations where they might not want to.*

— Dr. Ann M. Florini, *Horaeist*

*The one-meter imagery being proposed for sale commercially would provide a great deal of information on the activities of a potential adversary. When used in conjunction with accurate positioning data, it can be used for targeting. The US role in contributing to this capability being available to any user, at any time, with or without the consent of the US government must be carefully considered.*

— R. James. Woolsey, CIA Director, 1993, *Preservationist*

*As we enter this era of mutually assured observation, we must proceed with common sense, promoting the benefits of new remote sensing technologies while working to manage the risks. If we do so wisely, we can reap rich rewards.*

— David B. Sandalow, 2000, *Synergist*

Promises of rich rewards have tempted many to take risks for the possibility of greater gain. With the advent of the 1992 Land Remote Sensing Policy Act, the United States government set a course for space-derived transparency by setting conditions that preserve the technological edge enjoyed by the United States in remote sensing technologies while creating incentives for commercial vendors and users the opportunity to mine for monetary and information riches. Is supporting the development of commercial UHR technology and imagery products risky? In preservationist quarters,

yes. For horaeists, no. For synergists, it is still too early to know for sure but space-derived transparency promises rewards with manageable risks.

At the most basic level, transparency stems from a desire to know exactly what your neighbor has and what he is doing with what he has. If he will not tell you what you want to know then you must develop the means and methods to discern for yourself. You can find out how many beans and bullets he has but not necessarily what he intends to do with them. Thus, transparency can reveal behaviors and actions but it cannot reveal true intent. One of the means used since 1960 to open closed areas to inspection and reveal behaviors and actions is land remote sensing – it provides space-derived transparency. A more sophisticated means of counting beans and bullets, space UHR imagery still cannot tell you what a potential adversary intends to do with what he has.

## **The Emerging World**

In the bipolar world of the Cold War era, space-derived transparency revealed levels of threat, provided indications and warning of national behavior rather than intent, and in general, drove national security strategy and policy. Space-based imagery systems then and now count weapon systems, observe troop movements, provide early warning of stability threats, bear silent witness to small wars of national liberation, monitor compliance with treaties and agreements, and ultimately provide a level of assurance to political leaders that the security environment is relatively stable.

In the multipolar post-Cold War world, new laws and policies allowing commercialization of previous restricted space and information technologies, the greater number of potential users, and increasing demand for greater openness brought about by democratic political changes in more nations has made space-derived transparency a reality. This means of transparency is more important to the United States in particular as the number of nations and transnational bad actors bearing observation increase. Nations and transnationals armed with commercial UHR imagery potentially have “our eyes” and information power and thus may emerge as economic, political, and possibly military challengers to the United States. We must remember though that transparency, especially space-derived transparency may, in the absence of internationally accepted

behavioral norms, aggravate conflict, might not bring about a desired change in behavior, and can release information that can be misinterpreted, or worse, misused.<sup>219</sup>

## Themes and Conclusions

The available evidence on the various camps resolves into the following study themes and conclusions:

- Transparency and space-derived transparency are inevitable trends that preservationists must learn to accept, that horaeists must learn to correctly use within reasonable limits, and that synergists must continue to explore.
- The advanced nature of imaging and communications technology and the relative analytical inexperience of a large number of users may create the possibility for a disproportionate WWW or CNN effect that must be considered a factor in policy formulation and implementation.
- The trinitarian relationship between regulators, vendors, and users provides opportunities for abuse and synergy while promising greater technological advancement in space-based remote sensing technologies resulting in space-derived transparency.
- Unilateral, multilateral, and shutter control by other means policies designed to regulate the commercial imagery market and control imagery dissemination during crises may have unintended consequences that might undermine the US commercial imagery market. Additionally, new players, specifically NGOs, directly affect policy formulation and should have a role in developing it.

UHR imagery is not a panacea for achieving a horaeist utopia nor is it a threat to the security interests that preservationists hold dear. What falls out from the research is that space-derived transparency provided by commercial high-resolution space-based imaging systems is inevitable. Yes, the United States must ponder the potential threats to national security and consider means to control and mitigate these threats however; it cannot now stop that which it created – a market for UHR imagery technology and products. What can be done to minimize the potential threats while capitalizing on new synergies?

---

<sup>219</sup> Ann Florini. "The End of Secrecy," *Foreign Policy*, 20 June 1998.

## **Recommendations to Realize Synergy**

### **1. Develop Tactics, Techniques and Procedures (TTP) to peacefully coexist in a space-derived transparent world**

The evidence from horaeists, preservationists, and synergists show that transparency and space-derived transparency are facts of modern life. Democratization and globalization of the post-Cold War world empowered by advanced information and space-imaging technologies will cement these facts in government and military operations and policies. Regulation will become increasingly difficult as the user base expands, the market responds by providing more systems and products, and market forces of supply and demand ultimately reduce the costs associated with UHR imagery.

As the 22-26 January 2001 Shriever AFB space war-games showed, privately owned American and more importantly, foreign satellites, create risk in conflict and crisis and are a key issue for policy planners. Since foreign systems are not regulated to the extent US commercial systems are, the possibility of shutter control of foreign systems is remote. Short of turning off an imager, shutter control techniques such as “buying” all available satellite services may be practiced by our adversaries as well as the United States. However, shutter control may not be an effective option and potential destructive methods may prove politically untenable.

As there is no guarantee that foreign providers will support the US during a crisis, the US military must routinely conduct realistic exercises against a variety of space adversaries played by the 527<sup>th</sup> Space Aggressor Squadron in order to discover strengths and weaknesses of current policies. Based on the outcome of these exercises, the 76<sup>th</sup> Space Control Squadron and the Space Division of the US Air Force Weapons School should work together and with the other services to develop lethal and non-lethal tactics, techniques, and procedures to counter commercial space systems. If possible, US Space Command should work with commercial vendors, encouraging them to develop means to prevent their systems from being misused and potentially placed in a position where lethal and non-lethal control measures may have to be used. Cooperation between government and industry in this regard may mitigate risks to national security and provide greater rewards for both sides.



## 2. Anticipate and develop the means to manage the effects of space-derived transparency

The evidence demonstrates that UHR imagery in the hands of non-traditional users such as the media, non-governmental organizations, and malevolent forces may produce an enhanced CNN or WWW effect. The evidence suggests that because of awareness of such an effect and its associated phenomena it is possible to plan and employ means to mitigate the effects.

One method that appears to deflate investigative media inquires is ironically, openness or transparency. While some secrets are worth protecting, the preservationist tendency to keep everything secret generates intense curiosity and challenges the media and groups opposed to US interests to expose the secret irrespective of consequences. Since remote-sensing systems can see into denied areas, secretiveness that drives the media and others to find a way to “see inside” our protected areas may prove counterproductive. The evidence shows the media and other groups will find a way to get the information but are ill-equipped to properly interpret the space-derived imagery. In an agenda driven environment, the story they tell may prove more damaging than *volunteering* the right information.

If openness is not an option, then the next best method of control is to form a working relationship with the media and a select number of US State Department certified core-team, core-interest, specialist, and advocacy NGOs. Bring them into the process early and share what you can. Minimize the potential for imagery misinterpretation by providing analyzed imagery to these groups and suggest ways it might be used to convey the proper story. If necessary, co-opt them by placing the burden of the consequences of improper or premature release of such information squarely on their shoulders. This may forestall the immediate release of the information allowing time for policy planners and response agencies to mobilize and lead-turn the effect.

Anticipate that there will be an effect and be flexible with actions to respond to and counter the effect. The worst thing to do is to be caught unaware. If a crisis such as the 1 April 2001 EP-3 Surveillance Plane incident on Hainan Island springs up, anticipate that the media will purchase commercial satellite imagery. Assist them with their analysis and correct misinterpretations and misstatements of fact. As governments,

NGOs, and others use the mass media to convey messages to larger audiences, be prepared with UHR imagery from both commercial and other sources, if possible, that helps tell the right story in a less provocative manner.

3. Regulators should continue to enforce policies that make US commercial remote-sensing systems the best in the world while preserving a technological edge for the government through the National Reconnaissance Office (NRO)

The US commercial imagery market will thrive provided it develops technologies that furnish products that users want and need. In general, users appear to want imagery products and have not shown an interest in signals intelligence information such as listening to telephone conversations in an entire nation or capturing specialized intelligence on various industrial programs from space systems. Table 6-1 shows what kind of UHR imagery might be needed and how it might be used.

**Table 4. UHR Imagery Users and Uses<sup>220</sup>**

Category	Spatial Resolution	Imagery Types	Uses
<b>Arms Control</b>	Sub-meter – 10 meter	Panchromatic Infrared Multi-spectral Hyper-spectral Radar	<ul style="list-style-type: none"> <li>Observe military movements</li> <li>Monitor arms treaty compliance</li> <li>Monitor arms shipments and transfers</li> <li>Use as a tool for Confidence and Security Building Measures (CSBM)</li> </ul>
<b>Economic Development and Industrial Applications</b>	1 – 30 meter	Panchromatic Infrared Multi-spectral Hyper-spectral Radar	<ul style="list-style-type: none"> <li>Identify natural resources</li> <li>Determine best areas for industrial production</li> <li>May be used to determine if a company is compliant with zoning laws and environmental restrictions</li> <li>Used for real estate transactions</li> <li>Can be used for espionage</li> </ul>
<b>Environmental Monitoring</b>	1 – 10 meter	Panchromatic Infrared Multi-spectral Hyper-spectral	<ul style="list-style-type: none"> <li>Treaty monitoring</li> <li>Weather forecasting</li> <li>Agricultural monitoring and crop management</li> <li>Tracking endangered species and migration patterns</li> <li>Monitoring pollution and deforestation</li> </ul>
<b>Government</b>	Sub-meter – 10 meter	Panchromatic Infrared Multi-spectral Hyper-spectral Radar	<ul style="list-style-type: none"> <li>Arms control</li> <li>Military operations and espionage</li> <li>City planning and management</li> <li>Disaster planning and response</li> </ul>
<b>Human Rights Monitoring</b>	1 – 10 meter	Panchromatic Infrared Multi-spectral Hyper-spectral	<ul style="list-style-type: none"> <li>Observe prison systems such as the Gulag Archipelago of the former Soviet Union</li> <li>Monitor worker conditions</li> <li>Mapping slum areas or mass graves</li> <li>Epidemiological surveys</li> <li>Monitor protests or expose violations of human rights laws</li> </ul>
<b>Humanitarian Relief</b>	1 – 10 meter	Panchromatic Infrared Multi-spectral	<ul style="list-style-type: none"> <li>Locate and monitor internally displaced person and refugee movements</li> <li>Map roads, rivers, and other areas related to providing relief or establishing camps</li> </ul>

Typical users are currently not interested in the imagery fidelity that government arms control agencies and the military might need to dissect weapon systems or to provide mensurated data for precision munitions. Thus, a natural niche exists for the NRO to develop highly specialized and precise systems that the commercial world does not require today. Regulators should consult with the State Department, Department of Defense, the Department of Commerce, the Central Intelligence Agency, the NRO, and Congress to ensure that regulations preserve an edge. The bottom line: to maintain a

<sup>220</sup> This table is a compilation of the author's personal knowledge derived from Undergraduate Space Training, the USAF Weapons School, personal experience in the field, and from materials examined for

robust market, regulators and vendors need to work together to ensure that regulations are expansive enough to allow for the logical development and application of useful products that commercial users want to purchase.

4. Continue policies that require vendors to maintain records of who is purchasing imagery and of what.

Current regulations require US imagery vendors to maintain records for one year. This should be expanded to a minimum of three years in order to provide better trending analysis for regulators. Also, such record keeping provides transparency so that preservationists can monitor the imagery purchases of potential malevolent forces. The United States government might also consider establishing a contract with commercial vendors to provide duplicate images of all sites imaged. Considering the costs, this can be narrowed by groups requesting images, locations being imaged, types of imagery (panchromatic, MSI, etc.), or based on any combination of categories.

5. In order to reassure the market, regulators should specifically define the circumstances under which “shutter control” will be implemented.

Currently, PDD-23 is a classified document. For all intents and purposes specific shutter control circumstances and criteria listed within a classified document have no meaning except to instill fear in vendors and users that their service might be discontinued in a capricious manner. While this uncertainty might provide a degree of coercive control, it has inspired foreign governments to develop and market alternatives for potential users. Additionally, the uncertainties associated with PDD-23 have the effect of dampening the US market and creating greater incentives for foreign governments to exploit this fear and not regulate their own market.

While policy and decision makers want to maintain maximum flexibility, the United States government should publicly define fairly specific circumstances in which shutter control measures might be implemented by the Secretary of Commerce and provide a check and balance system that allows the executive branch limited discretion to implement it. In addition to publicly stated criteria that shutter control will be implemented if national security, international agreements, and/or foreign policy may be compromised, the US government should specify that shutter control is a means of last resort and will only be implemented:

- If a VITAL United States interest is at stake and;
- If users are engaged in a demonstrated pattern of actions that show a willful and flagrant disregard of the threat to the vital interest to include sharing this information with the threat or aligning with the threat by using the information against the United States and its legitimate interests.
- If there is a clear and present danger to the survival of the nation, the government, its vital infrastructure, or its social service and security network (health care, police, etc.).
- By the designated authority within the executive branch, the Secretary of Commerce, for a period of no more than 15 days unless Congress acts to extend the time period. This may be done by an act of the whole congress although it would be better if extension authorization was provided by a majority vote of both the House and Senate Select Committees on Intelligence.

In the event shutter control is implemented, the executive branch should be required to document each reason why to include naming specific groups, actions, violations, etc. that form the basis for the implementation decision. This will allow judicial recourse to vendors and users alike in the event a group or organization was inadvertently maligned or harmed by this process. Such specificity and a built in restraint on the ability to implement and extend shutter control could reassure users and the market that the US government will implement such a policy only under the gravest of circumstances. It may also provide clearer guidance so that better decisions can be made.

6. Identify the government, private venture, and key NGO players in the policy making process and develop a formalized and habitual working relationship with them.

As the evidence shows, the effects of space-derived transparency in specific incidences and crises will likely further exacerbate the already truncated policy making process. This shortened timeline has in some cases (e.g. Somalia) allowed for

implementation of policies without considering the second and third order effects, developing proper entry and exit strategies, and without determining the desired end-state. As has been suggested by Dr. Livingston, Representative Hamilton, and Mr. Strobel, awareness of effects and an effective policy formulation strategy may ameliorate the effects of truncation. Part of this formulation strategy is having the right players at the table when considering policies and courses of action.

As previously discussed in Chapter 5, NGOs are proliferating and are being invited by and in some cases contracted by governments to assume roles in meeting needs that governments cannot or will not meet. They do not need governments to accord them official status to have power. Rightly or wrongly, by their presumed benevolent nature, NGOs are accorded a degree of moral deference by the body politic, a deference that most governments do not often enjoy. This does not suggest that all NGOs are good and capable of providing services or that they will serve the public interest first. However, NGOs are a force that cannot be ignored. The evidence suggests that a public-private partnership should be nurtured.

There are some reputable NGOs that through contract or agreement, could become responsible and reliable partners in fomenting and executing effective policy and courses of action. A government interagency focal point to certify and manage the certification, orientation, and direction of NGOs is critical to an effective partnership. Bringing them into the policy process early allows for better communication, conveys a sense of policy “ownership,” and places a good measure of responsibility for policy success on the NGOs. Their desire to maintain their credibility can be nurtured into a positive policy force.

7. Provide certified, responsible, and effective NGOs and in some cases, the media, analyzed UHR imagery.

Small and often lacking resources on the scale of government, NGOs and the media often embrace new technologies. If they see value in UHR imagery they will, regardless of regulation, use it to further their goals. As was noted in Chapter 5, this presents traditional policy makers with a dilemma. We know there is a policy truncating effect produced by supposedly “irrefutable” images and we know that NGOs and the media consistently misinterpret images.

If, as the evidence suggests, NGOs and the media are players using technologies and processes comparable to government and they can and do influence policy development from the outside, then there is a need to bring them into the policy process. Whether armed with good or bad imagery analysis, NGOs and the media will use it to tell a story – a story that may drive the government to act in ways not in accord with the nation’s interest. Thus it will become more important to provide these players with correctly analyzed imagery and information so that the story they tell is one supported by the real “irrefutable” facts rather than what has passed for fact in the past.

Players properly armed with good information and imagery and part of the policy team, may prove most effective in public diplomacy by raising awareness and could have some role in private diplomacy by providing a threat of coercive moral effect. They may be a new source of information for government through their global networks and in certain instances have proven to possess skills that may serve the nation’s important and humanitarian interests. Knowing what these players need, appreciating what they can do (both good and bad), and using them in the most appropriate way likely makes for better policy and more effective action.

While there is no guarantee that government-NGO partnerships will be effective or successful, having these players on the same team may provide greater policy synergy than having them act alone in a way that may truncate timelines resulting in ineffective or counterproductive policies. The bottom line: these new players should not be ignored or encouraged to do nothing otherwise they may find a way to use UHR imagery in ways that serve their own interest rather than the national interest.

## **Final Thoughts**

Space-derived transparency and its potential impact on US policy are concerns that good strategy and a cooperative spirit may assuage. While the US government and the military must consider its effect on national security and evaluate its potential to do harm in the wrong hands, they are likely to find opportunities to vitiate the harm and produce better policy. The evidence suggests that a partnership between government, the military and select non-governmental organizations using commercial and other UHR imagery may provide space-derived transparency to address specific crisis situations.

Could space-derived transparency be used, in some situations, to alter the international dynamic by empowering diplomatic efforts to engage allies and adversaries alike both publicly and privately to either expose potentially threatening actions or build confidence between nations, perhaps reversing the march towards conflict? Could it potentially give substance to diplomatic and informational campaigns by providing, as it did in the 1962 Cuban Missile Crisis, clear and convincing evidence of hostile intent or actions that can bring condemnation and perhaps compel a potential aggressor to yield?

Is there a possibility that NGOs could be tied into a government network in which analyzed imagery from various national, military, commercial, and civil space systems and other sources could be shared to provide a greater good? Is it possible that by sharing information in a synergistic way it will engender trust between the US government and select NGOs so that space-derived transparency could be used to:

- Bring both internal and external pressure on a nation's leadership that is acting or threatening to act against its own people or its neighbors;
- Identify and respond early to impending or actual calamities such as famine, pestilence, disasters, and war; and/or
- Provide, through a *quid pro quo* arrangement, assessments and information to assist with the intelligence preparation of the battlespace so necessary to develop plans and conduct military operations.

In short, this study reveals there is an opportunity for the United States government in partnership with other players to use UHR imagery technology, systems, and products to provide transparency in concert with effective policies and courses of action that may prevent or resolve crises.

While this is a theoretical study, it is interesting to note that from 22 – 26 January 2001, Air Force Space Command sponsored a wargame, *Shriever 2001*, that had land, sea, air, and space forces operating in a future space-derived transparent environment. Real-world commercial imagery vendors participated as players in the game along with the military players and civilian policy analysts. While the final report has not been



released yet, player's after action reviews at the end of the game drew many of the same conclusions from the operational wargame that appear in this study.<sup>221</sup>

Horaeist visions of a peaceful Earth-state and preservationist fear of a world rife with conflict represent the extremes of the same continuum – a more transparent world. Space-derived transparency is one part of that continuum. It may empower non-traditional imagery users in ways similar to traditional government users. Commercial UHR imagery in the hands of non-traditional users means only that it will be used to meet their needs, for good or ill, just as it has been used since 1960 by early spacefaring nations. How the imagery is used rather than the fact that it is used determines whether it is a benevolent or malevolent force. Used properly, UHR imagery may help improve the human condition. Like any new technology, inappropriate or malevolent use may create new or exacerbate existing problems. The point is that UHR imagery will be used for a variety of purposes and that its use likely makes the world more transparent.

Space-derived transparency is a fact of life – it is enabled by technology that cannot be uninvented, regulated away, or obliterated. As with all technologies, we must learn to live with it and use it the best way we can. It provides opportunities for government to work with other users to protect and advance important and humanitarian national interests. The United States paved the way for space-derived transparency with laws and policies that recognize the potential good and dangers of the technology.

Since 1960, the United States has pioneered UHR technology and analytical processes, learning the best ways to use the products and developing policies that make it a beneficial tool in arms control, indications and warning, and building situational awareness. In the 1990s, we made this technology widely available for others to derive similar benefits and opened the possibility for other uses such as environmental monitoring, city planning, economic and industrial development, and for disaster and humanitarian response. Since government as a regulator sets the rules of the game for each of these areas and the vendors and users operate within the regulatory construct, there is room for US led synergy.

---

<sup>221</sup> Members of the 527th Space Aggressor Squadron who were in the audience when the author presented his study findings revealed this fact. This discussion took place at the Space Warfare Center at Schriever AFB, Colorado on 18 June 2001.

The synergy inherent in space-derived transparency won't build the horaeist Earth-state nor will it destroy the preservationist nation-state – it does provide the prospect for more efficacious policy. In the end, space-derived transparency is a step forward into the future for each camp . . . the challenge for the United States lies in forging synergies while maintaining the balance. As it has with almost any challenge in the past, the United States will likely prove to be more than equal to the task.

## ***Bibliography***

### **PUBLIC LAW AND SPACE POLICY**

- DODD 3230.3 DoD Support for Commercial Space Launch Activities, October 14, 1986, USDR&E, 7 March 1988.
- Interim Final Licensing Regulations, 14 CFR CH. III, Vol 51, No. 38, 6870-83, 26 February 1986.
- National Security Decision Directive 94, "Commercialization of Expendable Launch Vehicles," 16 May 1983.
- National Space Policy Fact Sheet. 19 September 1996. on-line, Internet, 6 March 2001), available from <http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/html/fs/fs-5.html>.
- Office of the US Trade Representative, *Guidelines for U.S. Implementation of the Agreement Between the U.S. and Russian Federation Government Regarding International Trade in Commercial Space Launch Services*, 3 October 1994. on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/59FR11360.html>.
- PDD-NSC-23, "Foreign Access to Remote Sensing Capabilities (U)," 10 March 1994.
- PDD-NSC-49/NSTC-8, "National Space Policy (U)," 14 September 1996.
- Secretary of Defense approval of March 26, 1985 SAF/US Memorandum to Secretary of Defense, 4 April 1985.
- Secretary of Defense Memorandum, *Department of Defense Space Policy*, NUMBER 3100.10, 9 July 1999.
- Space Commercialization Promotion Act of 1996 (HR3936): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/hr3936.html>.
- Space Transportation Services Purchase Act of 1993 (HR2731): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/hr2731.html>.
- United States Code Title 15, Chapter 82, Land Remote Sensing Policy, derived from Section 1 of Public Law 102-555 cited as the Land Remote Sensing Policy Act.: on-line, Internet, 14 December 2000, available from <http://www.geo.arc.nasa.gov/sge/landsat/15USCch82.html>.

### **SPACE TREATIES**

- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH766.html>.
- Agreement On The Rescue Of Astronauts, The Return Of Astronauts And The Return Of Objects Launched Into Outer Space (1968): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH523.html>.

Agreement Relating To The International Telecommunications Satellite Organization "INTELSAT" (With Annexes And Operating Agreement) (1971): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH585.html>.

Convention On International Liability For Damage Caused By Space Objects (1972): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH595.html>.

Convention on Registration of Objects Launched into Outer Space (1975): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH653.html>.

Convention on the International Maritime Satellite Organization (INMARSAT) with Annex and Operating Agreement (1976); as amended 1985; with Protocol (1981): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH688.html>.

Treaty Banning Nuclear Weapon Tests In The Atmosphere, In Outer Space And Under Water (1963): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH454.html>.

Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies (1967): on-line, Internet, 14 December 2000, available from <http://www.islandone.org/Treaties/BH500.html>.

#### **ARTICLES, PERIODICALS, AND BOOKS**

A National Security Strategy for a Global Age, Washington D.C.: Government Printing Office, December 2000.

Air Force Doctrine Document (AFDD) 1. *Air Force Basic Doctrine*. September 1997.

Air Force Doctrine Document (AFDD) 2. *Organization and Employment of Aerospace Power*. 28 September 1998.

Air Force Doctrine Document (AFDD) 2-2. *Space Operations*. August 1998.

Air Force Manual (AFM) 1-1. *Basic Aerospace Doctrine of the United States Air Force*. 2 vols., March 1992.

Albright, David; Gay, Corey; Hamza, Khidhir. "Development of the Al-Tuwaitha Site: What if the Public or the IAEA had Overhead Imagery?," Institute for Science and International Security (26 April 1999), on-line, Internet, 9 April 2001, available from <http://www.isis-online.org/publications/iraq/tuwaitha.html>.

*America's Air Force: Vision 2020*. Washington, D.C.: Department of the Air Force, 2000.

*Army Vision 2010*. Washington D.C.: Headquarters, Department of the Army, November 1996.

Axworthy, Lord Lloyd, Foreign Minister of Canada. Address. Oslo NGO Forum on Banning Antipersonnel Landmines, Oslo, Norway, 10 September 1997.

Babski, Major Ronald J. Jr. "Hide Your Shape – Sun Tzu: ROE Considerations for Negating High-Resolution Commercial Imagery Satellites." Newport, R.I.: Naval War College, 1999.

Barber, Ben. "Group Will Battle Propaganda Abroad." *Washington Times*. 28 July 1999.

Bates, Jason. "EarthWatch to Sharpen its Images." *Spacenews.com*. 22 March 2001.

- \_\_\_\_\_. "U.S. Approves Licenses for Two Imaging Satellites with Half-meter Resolution." Spacenews.com. 18 Decemeber 2000.
- Berkowitz, Mark J.. "National Space Policy and National Defense," *Spacepower for a New Millennium: Space and U.S. National Security*. Edited by Lt Col Peter L. Hays et al. United States Air Force Institute for National Security Studies. New York, New York: The McGraw Hill Companies Inc, 2000.
- Black, Lt Cmdr J. Todd. "Commercial Satellites: Future Threats or Allies," *Naval War College Review*, Volume LII, no. 1, sequence 365, Winter 1998. On-line, Internet, 14 December 2000, available from <http://www.fas.org/eye/art5-w99.htm>.
- Broad, William J. "Spy Photos of Korea Missile Site Brings Dispute," The New York Times, 11 January 2000.
- Brugioni, Dino A., *Eyeball to Eyeball: The Inside Story of the Cuban Missile Crisis*, New York, New York: Random House, 1990.
- Bruner, William W. III. "National Security Implications of Inexpensive Space Access," *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*. Edited by Col Bruce M. DeBlois. Maxwell AFB, Ala.: Air University Press, 1999.
- Byman, Daniel, et al. *Strengthening the Partnership: Improving Military Coordination with Relief Agencies and Allies in Humanitarian Operations*. Santa Monica, Calif.: RAND, 2000.
- Concept for Future Joint Operations: Expanding Joint Vision 2010*. Washington, D.C.: Joint Chiefs of Staff, 1997.
- Daehnick, Christian C. "Blueprints for the Future: Comparing National Security Space Strategies," *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*. Edited by Col Bruce M. DeBlois. Maxwell AFB, Ala.: Air University Press, 1999.
- DeBlois, Bruce M. "Space Sanctuary: A Viable National Strategy," School of Advanced Airpower Studies, on-line, Internet, 6 March 2001, available from <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj98/win98/debloistxt.htm>.
- Dehqanzada Yahya A.; Florini, Ann M. *Secrets for Sale: How Commercial Satellite Imagery Will Change the World*. Washington D.C.: Carnegie Endowment for International Peace, 2000.
- Florini, Ann M. "The End of Secrecy," *Foreign Policy*, 20 June 1998.
- \_\_\_\_\_. *The Third Force – The Rise of Transnational Civil Society*. Washington D.C.: Carnegie Endowment for International Peace, 2000.
- \_\_\_\_\_.; Dehqanzada, Yahya A. "No More Secrets? Policy Implications of Commercial Remote Sensing Satellites," Carnegie Endowment for International Peace, on-line, Internet, 6 March 2001, available from <http://beta.ceip.org/files/publications/NoMoreSecrets.asp>.
- Galtung, Fredrik. "A Global Network to Curb Corruption," in *The Third Force: The Rise of Transnational Civil Society*. Edited by Ann M. Florini. Washington D.C.: Carnegie Endowment for International Peace, 2000.
- Global Engagement: A Vision for the 21<sup>st</sup> Century Air Force*. Washington, D.C.: Department of the Air Force, 1997.

- Gourevitch, Peter. *We Wish to Inform You that Tomorrow We Will Be Killed With Our Families: Stories From Rwanda*, New York, New York: Farr, Straus, and Giroux, 1999.
- Graham, Mary. "High Resolution, Unresolved." The Atlantic Online. July 1996.
- On-line, Internet, 14 April 2001, available from <http://www.theatlantic.com/issues/96jul/satellite/satellite.htm>.
- Gray, Colin S. *Modern Strategy*. Oxford, New York: Oxford University Press, 1999.
- Grundhauser, Lt Col Larry K.. "Sentinals Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," *Airpower Journal* Volume XXII, no. 4, Winter 1998.
- Hamilton, Congressman Lee. Ranking Member, International Relations Committee, US House of Representatives. "Changes in American Foreign Policy Over the Past 30 Years." Oscar Iden Lecture. Georgetown University Institute for the Study of Diplomacy, Washington, D.C., 18 November 1998.
- Hays, Lt Col Peter L., et al. "Spacepower for a New Millennium," *Spacepower for a New Millennium: Space and U.S. National Security*. Edited by Lt Col Peter L. Hays et al. United States Air Force Institute for National Security Studies. New York, New York: The McGraw Hill Companies Inc, 2000.
- \_\_\_\_\_. "Transparency, Stability, and Deception: Military Implications of Commercial High Resolution Imaging Satellites in Theory and Practice," 19 February 2001.
- "The Heisenberg Effect, the Philippines and Stratfor." Weekly Analysis, Global Intelligence Update. On-line, Internet, 2 May 2001, available from <http://www.stratfor.com/SERVICES/GIU/120699.asp>.
- Howard, Michael I. *Masters of War: Classical Strategic Thought*. Portland, Ore.: Frank Cass Publishers, 2001.
- Johnson, Dana J., et al. *Space: Emerging Options for National Power*. Washington, D.C.: National Defense Research Institute, 1998.
- Joint Publication 1-02. *Department of Defense Dictionary of Military and Associated Terms*. June 2000 (as amended).
- The Limits of Coercive Diplomacy*. Edited by Alexander L. George and William E. Simons. Boulder, Colorado: Westview Press, Inc., 1994.
- Kline, Karen; Raustiala, Kal. "International Environmental Agreements and Remote Sensing Technologies," Sponsored by the Socioeconomic Data and Applications Center (SEDAC). Center for International Earth Science Information Network. Palisades, NY: Columbia University, September 2000.
- Kaspar, Lt Col Beth M. "The End of Secrecy? Military Competitiveness in the Age of Transparency." Maxwell AFB, Ala.: Air War College, 2000.
- Lipman, Jonathan. "Views You Can Use . . . or Abuse?" Space.com (5 January 2000).: on-line, Internet, 14 April 2001, available from [http://www.space.com/business/businesstechnology/business/ikonos\\_photosale\\_000105.html](http://www.space.com/business/businesstechnology/business/ikonos_photosale_000105.html).
- Livingston, Dr. Steven. "Clarifying the CNN Effect: An Examination of Media Effects According to Type of Military Intervention." Research Paper R-18. Cambridge, Mass: Harvard University, June 1997.
- \_\_\_\_\_. Statement made during the "No More Secrets? Policy Implications of Commercial Remote Sensing Satellites" conference at the Carnegie Endowment for International

- Peace, 26 May 1999. On-line, Internet, 21 May 2001, available from <http://www.ceip.org/programs/transparency/RemoteSensingConf/LivingstonPage.htm>.
- Lupton, David E., Lt Col., *On Space Warfare: A Space Power Doctrine*, Washington, D.C.: US Government Printing Office, 1988.
- McDougall, Walter A. ... *The Heavens and the Earth: A Political History of the Space Age*. New York: Basic Books, 1985.
- McKinley, Lt Col Cynthia A.S. "When the Enemy has Our Eyes," *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*. Edited by Col Bruce M. DeBlois. Maxwell AFB, Ala.: Air University Press, 1999.
- Mekata, Motoko. "Building Partnerships Toward a Common Goal: Experiences of the International Campaign to Ban Landmines." In *The Third Force – The Rise of Transnational Civil Society*. Edited by Ann M. Florini Washington D.C.: Carnegie Endowment for International Peace, 2000.
- Merges, Robert P.; Reynolds, Glenn H. "The News media Satellites and the First Amendment: A Case Study in the Treatment of New Technologies." *High Technology Law Journal*, Vol 3, Spring 1988.
- Moorman, Thomas S. Jr., General, USAF (ret). "The Explosion of Commercial Space and the Implications for National Security." *Airpower Journal*, Volume XIII, No.1, Spring 1999.
- National Aeronautics and Space Act of 1958*, Public Law #85-568, 72 Stat., 426. Signed by the President on July 29, 1958, Record Group 255, National Archives and Records Administration, Washington, D.C; available in NASA Historical Reference Collection, History Office, NASA Headquarters, Washington, D.C.]
- National Imagery and Mapping Agency Budget. GIC Budget for Contract Production. Omnibus Contractor Status (as of 13 April 2001). . On line, Internet, 21 April 2001, available from <http://164.214.2.59/ogic/budget.html>.
- Oberg, James E. *Spacepower Theory*, Maxwell Air Force Base, Alabama: Air University Press, 1998.
- Osterhout, Robert. Statement made during the "No More Secrets? Policy Implications of Commercial Remote Sensing Satellites" conference at the Carnegie Endowment for International Peace, 26 May 1999. On-line, Internet, 21 May 2001, available from <http://www.ceip.org/programs/transparency/RemoteSensingConf/OsterhoutPage.htm>.
- Owens, Bill. *Lifting the Fog of War*. New York: Fasrrar, Straus and Giroux, 2000.
- Pape, Robert A. *Bombing to Win: Air Power and Coercion in War*. Ithaca, New York: Cornell University Press, 1996.
- "Pentagon Papers," Microsoft® Encarta® Online Encyclopedia 2001 <http://encarta.msn.com> © 1997-2001 Microsoft Corporation. All rights reserved.
- Porter, Keith. "The WWW Effect." [Worldnews@about.com](mailto:Worldnews@about.com). On line, Internet, 14 April 2001, available from <http://worldnews.about.com/newsissues/worldnews/library/weekly/aa121399.htm>.
- Powell, General Colin; Persico, Joseph E.. *My American Journey*, New York, New York: Ballantine Books, 1995.
- Reliefsat website. On-line, Internet, 31 March 2001, available from <http://www.nrsc.no/reliefsat/>.

- Report of the Committee on the Peaceful Uses of Outer Space, *List of International Agreements and Other Available International Documents Relevant to Space-Related Activities*. Vienna, Austria: United Nations, 2001.
- Report of the Independent Commission on the National Imagery and Mapping Agency, *The Information Edge: Imagery Intelligence and Geospatial Information in an Evolving National Security Environment*. Washington, D.C.: Government Printing Office, 2000.
- Report of the National Defense Panel, *Transforming Defense: National Security in the 21st Century*. Washington, D.C.: Government Printing Office, 1997.
- Report of the White House, *A Blueprint for New Beginnings: A Responsible Budget for America's Priorities*. Washington D.C.: Government Printing Office, 2001.
- Report of the White House, *A National Security Strategy for a New Century*. Washington D.C.: Government Printing Office, 1998.
- Report of the United States Commission on National Security, *New World Coming: American Security in the 21<sup>st</sup> Century*, Washington D.C.: Government Printing Office, 1999.
- Report of the United States Commission on National Security, *Road Map for National Security: Imperative for Change*, Washington D.C.: Government Printing Office, 2001.
- Report of the United States Commission on National Security, *Seeking a National Strategy: A Concert for Preserving Security and Promoting Freedom*, Washington D.C.: Government Printing Office, 2000.
- "Report on CNN Broadcast." CNN, 2 July 1998. On line, Internet, 14 April 2001, available from <http://www.cnn.com/US/9807/02/tailwind.findings/index.html>.
- Sandalow, David B. Assistant Secretary for Oceans and International Environmental and Scientific Affairs, U.S. Department of State. Address. Symposium on "Viewing the Earth: The Role of Satellite Earth Observations and Global Monitoring in International Affairs," George Washington University, Washington D.C., 6 June 2000.
- Schelling, Thomas C. *Arms and Influence*, Fredericksburg, Virginia: Bookcrafters, Inc., 1966.
- Schmidt, Laura J. "New Tools for Diplomacy: Remote Sensing Use in International Law," NASA's Distributed Active Archive Center, on-line, Internet, 10 April 2001, available from <http://www.earthobservatory.nasa.gov/study/diplomacy/>.
- Simmons, P.J. "Learning to Live With NGOs." *Foreign Policy* 112. Fall 1998.
- Sietzen, Frank. "Spy Satellite Image Business Booms." Space.com. 1 May 2000. On line, Internet, 14 April 2001, available from [http://space.com/business/technology/business/commercial\\_remote\\_sense-000427.html](http://space.com/business/technology/business/commercial_remote_sense-000427.html).
- "Space Almanac." *Air Force Magazine* Volume 82, no. 8, August 1999.
- Smith, Senator Bob (R-N.H.). "The Challenge of Space Power," *Airpower Journal* Volume XIII, no.1. Spring 1999.
- Spaceimaging.com. Copyright © Space Imaging. All RIGHTS RESERVED. Accessed via Global Security.org. On-line, Internet, 22 April 2001, available from



- <http://www.globalsecurity.org/military/world/china/facility/lingshui.htm>.
- Spires, David N. *Beyond Horizons: A Half Century of Air Force Leadership*, Maxwell AFB, Ala.: Air University Press, 1998.
- Schwarzkopf, General H. Norman; Petre, Peter. *General H. Norman Schwarzkopf The Autobiography: It Doesn't Take a Hero*, New York, New York: Bantam Books, 1992.
- Stoney, William E. Mitretek Systems. Address. Carnegie Endowment for International Peace Conference "No More Secrets? Policy Implications of the New Commercial Remote Sensing Satellites." 26 May 1999.
- Strobel, Warren. "The CNN Effect," *American Journalism Review*. May 1996.
- Szebehely, Victor G. *Adventures in Celestial Mechanics: A First Course in the Theory of Orbits*, University of Texas Press, Austin, Texas, 1993.
- Terrill, Colonel Delbert R. Jr., *The Air Force Role in Developing International Outer Space Law*, Maxwell AFB, Alabama: Air University Press, 1999.
- Testimony. Mark Brender, Chairman, Radio-Television Directors Association Remote Sensing Task Force before U.S. House of Representatives Subcommittee on Space and Aeronautics, 24 July 1996. On-line, Internet, 6 March 2001, available from [http://www.house.gov/mark\\_brender.htm](http://www.house.gov/mark_brender.htm)
- "The Non-governmental Order," *The Economist*, 11 December 1999.
- "The Rise of Space." *Air Force Magazine* Volume 82, no. 8, August 1998.
- Thomas, Gerald B. "External Shocks, Conflict and Learning as Interactive Sources of Change in US Security Policy," *Journal of Public Policy* 19, Spring 1999.
- Thompson, Robert Smith, *The Missiles of October: The Declassified Story of John F. Kennedy and the Cuban Missile Crisis*, New York, New York: Simon & Shuster, 1992.
- United States Space Command: Vision for 2020*. Colorado Springs, Colo.: United States Space Command, 1997.
- U.S. Bureau of the Census, International Database, on-line, Internet, 11 February 2001, available from <http://www.census.gov/ipc/www/worldpop.html>.
- VERTIC website. on-line, Internet, 9 April 2001, available from <http://www.vertic.org/>.
- Williams, Jody, Coordinator, International Commission to Ban Landmines. Address. Treaty Signing Conference and Mine Action Forum, Ottawa, Canada, 3 December 1997.
- Wrong, Michela. *Financial Times*, 25 November 1996, quoted in Nik Gowing, "'Dispatches from Disaster Zones': The Reporting of Humanitarian Emergencies," paper prepared for Conference on New Challenges and Problems for Information Management in Complex Emergencies, London, 27-28 May 1998.
- Yearbook of International Organizations (by type) 1999/2000 edition published online by the Union of international Associations: on-line, Internet, 31 March 2001, available from <http://www.uia.org/>
- Zakaria, Tabassum. "US Group Puts N. Korea Missile Site Pictures on Web," *Reuters*, 11 January 2000.

Ziegler, David W. "Safe Heavens: Military Strategy and Space Sanctuary," *Beyond The Paths of Heaven: The Emergence of Spacepower Thought*. Edited by Col Bruce M. DeBlois. Maxwell AFB, Ala.: Air University Press, 1999.